BUFFALO NATIONAL RIVER

Harrison, Arkansas

Draft Fire Management Plan

Draft Environmental Assessment

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U.S. Department of the Interior

FIRE MANAGEMENT PLAN

for

BUFFALO NATIONAL RIVER

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I. INTRODUCTION

A. REQUIREMENTS

The Fire Management Plan (FMP) is an addendum to Buffalo National River's Resource Management Plan. This plan outlines a detailed program of actions to be taken by Buffalo National River (BNR) management staff to meet the fire management goals for BNR.

The plan is also guided by Director's Order-18 (DO-18) (http://www.nifc.nps.gov/fire/policy/do18/do18.htm) which requires that all park units with vegetation capable of sustaining fire develop a FMP. Until a FMP is approved, BNR will aggressively suppress all wildland fires, taking into account the safety of firefighting personnel, the visiting public and protection of all resources at risk on the unit.

B. GOALS AND OBJECTIVES TO ACHIEVE

Overall resource management objectives for BNR guide the FMP. Resource management objectives determine whether fire may be used as a tool to manipulate vegetation and how it will be managed.

1. Unit Objectives

Objectives from BNR's Master Plan (1977) that relate to wildland fire management follow:

- Openings – The openings cut by river, man, or fire, in many cases provide the 'edge' habitat of variety and animal activity so appealing to man for wildlife observation.
- Open fields – Open fields will be maintained where scenic and wildlife habitat will be enhanced.
- Game Habitat – Improvement of game habitat for hunting will be undertaken where it can be coordinated with other programs such as improvement of scenic or general wildlife habitat and maintaining open fields.
- Plant Succession – The nature of the plant succession in the area, the role of fire, and the extent and effect on forest types of former logging activities should be known; endemic plant species will be identified so they can be protected.
- Perpetuation of Resources – BNR area will be managed for perpetuation of the resources, while providing recreation for visitors in such a manner that the impact on the environment will be minimized.

2. National Fire Plan Goals

In addition to existing planning document objectives, there are 4 goals in the National Fire Plan (NFP) (http://www.fireplan.gov/) that are addressed in unit fire management plans.

Goal 1. Improve Prevention and Suppression – Improvements in cooperative efforts with local units of government and other Federal agencies will result from direction in this plan.

Goal 2. Reduce Hazardous Fuels – Projects proposed in this plan, both mechanical and prescribed fire will assist meeting this goal at BNR.

Goal 3. Restore Fire Adapted Communities – Projects proposed for Goal 2 would continue the restoration of fire to the vegetative community at BNR.

Goal 4. Promote Community Assistance – Through the Rural Fire Assistance Program, funding has been provided to several rural VFDs for wildland equipment. A potential exists for additional VFD support as well as technical assistance to nearby communities for risk reduction in the wildland urban interface.

C. NEPA AND OTHER COMPLIANCE

An Environmental Assessment (EA) guides the FMP and complies with National Environmental Policy Act (NEPA) (http://www4.law.cornell.edu/uscode/42/ch55.html#PC55) requirements and National Park Service (NPS) policy. The completed EA analyzes environmental impacts of the operations detailed in this plan.

The FMP will implement activities in accordance with the regulations and directions governing the protection of historic and cultural properties as outlined in the Department of Interior Manual, Part 519 (519 DM), and Code of Federal Regulations (36 CFR 800). The National Historic Preservation Act of 1966 (NHPA), as amended, Section 106, (http://www4.law.cornell.edu/uscode/16/470.html) sets the requirements for the protection of cultural properties found on the unit.

There are several endangered species identified as resident of BNR. An Endangered Species Act, Section 7 consultation will be requested from the U.S. Fish and Wildlife Service.

The EA, State Historic Preservation Officer concurrence and Section 7 consultation results will be found in Appendix D.

D. AUTHORITY FOR IMPLEMENTATION

The legal authority for the operation of the fire management program is found in 16 U.S.C. Chapters 1 and 3. The specific authorities can be found in 620 DM 1.1, (http://elips.doi.gov/elips/release/3203.htm). The Organic Act of the National Park Service (August 25, 1916, Section 102) provides the authority for implementation of this plan.

The authority for FIREPRO funding (Normal Fire Year Programming) and all emergency fire accounts is found in the following authorities:

1. Section 102

   Section 102 of the General Provisions of the Department of the Interior's annual Appropriations Bill provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.

2. Public Law 101-121

   Public Law 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990 established the funding mechanism for normal year expenditures of funds for fire management purposes.

3. 31 USC 665 (E) (1) (B)

   Title 31, United States Code, Section 665 (E) (1) (B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

II. COMPLIANCE WITH POLICY AND RELATION TO OTHER PLANS

A. NPS AND 2001 FEDERAL FIRE MANAGEMENT POLICY

This FMP is prepared to meet the policy requirements of Director's Order 18, Wildland Fire Management dated November 17, 1998. The primary NPS policy consideration from DO 18 is: "Wildland fire may contribute to or hinder the achievement of park objectives. Therefore, park fire management programs will be designed to meet resource management objectives prescribed for various areas of the park and ensure that firefighter and public safety are not compromised." In addition, preparation of this plan meets the requirements set forth in Department of Interior Manual 620 (620 DM) and the requirements of the Federal Fire Policy update of 2001.

The goals of the NPS wildland fire management program are to:

- Conduct a vigorous and safe wildland fire management program with the highest professional and technological standards.
- Identify the type of wildland fire that is most appropriate to specific situations and areas.
- Efficiently accomplish resource management objectives through the application and management of prescribed and wildland fires.
- Continually evaluate the wildland fire program operations and accomplishments to better meet program goals by refining treatment and monitoring methods, and by integrating applicable technical and scientific advancements.

The 2001 Federal Fire Management Policy update addresses 17 distinct items, the foremost being safety; all Fire Management Plans and activities must reflect this commitment. The full text of the policy, Secretarial Transmittals, and Appendices may be found at (http://www.nps.gov/fire/fire/policy/rm18/index.htm).

The four goals of the National Fire Plan are also addressed is this plan (see Section I.B.2.)

B. RELATION TO ESTABLISHING LEGISLATION

1. Establishment

Buffalo National River, containing approximately 95,700 acres, was established by Public Law 92-237 (86 Stat. 45) on March 1, 1972.

2. Purpose

16 USC § 460m-8 states the purpose of establishment: ". . . . conserving and interpreting an area containing unique scenic and scientific features, and preserving as a free-flowing stream an important segment of the Buffalo River in Arkansas for the benefit and enjoyment of present and future generations . . . .".

16 USC § 460m-12 further directs: "The Secretary shall administer, protect, and develop the Buffalo National River in accordance with the provisions of sections 1, 2, 3, and 4 of this title, as amended and supplemented; except that any other statutory authority available to the Secretary for the conservation and management of natural resources may be utilized to the extent he finds such authority will further the purposes of this subchapter

3. Administration

Buffalo National River under the Organic Act of August 25, 1916, which established the National Park Service. This act states the purpose of the National Park Service is, "…to conserve the scenery and natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations".

4. Threatened and Endangered (T&E) Species

Buffalo National River species listed as endangered under the Endangered Species Act of 1973 (http://endangered.fws.gov/esa.html) include gray, Indiana, and Ozark big-eared bats, the southern bald eagle is listed as threatened. Several species, such as the alligator snapping turtle, are candidates for future listing.

The implementation of BNR's fire management program will not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat. Fire management operations will consider appropriate actions to identify and protect from adverse effects any rare, threatened or endangered species currently or subsequently located within BNR. A Section 7 Consultation with the U.S. Fish and Wildlife Service will be required.

C. OBJECTIVES OF MASTER PLAN RELATED TO FIRE MANAGEMENT

There is no current General Management Plan. The Final Master Plan for Buffalo National River provides the following general guidance for managing the park's natural resources related to the use of fire.

1. Openings

The openings cut by river, man, or fire, in many cases provide the 'edge' habitat of variety and animal activity so appealing to man for wildlife observation.

2. Open fields

Open fields will be maintained where scenic and wildlife habitat will be enhanced.

3. Game Habitat

Improvement of game habitat for hunting will be undertaken where it can be coordinated with other programs such as improvement of scenic or general wildlife habitat and maintaining open fields.

4. Plant Succession

The nature of the plant succession in the area, the role of fire, and the extent and effect on forest types of former logging activities should be known; endemic plant species will be identified so they can be protected.

5. Perpetuation of Resources

The area will be managed for perpetuation of the resources, while providing recreation for visitors in such a manner that the impact on the environment will be minimized.

D. OBJECTIVES OF RESOURCE MANAGEMENT PLAN RELATED TO FIRE MANAGEMENT

The following objectives from the 1998 Resource Management Plan relate directly to fire management.

1. Fire Effects

Unwanted wildland fires may cause damage to delicate ecosystems, degrade the scenic value of natural areas and destroy property. Conversely fire can also be used as a valuable resource management tool to improve wildlife habitat, maintain open areas and prevent forest fuel build-up. Very few lightning or natural caused fires have been recorded for the Buffalo National River region. However, the Ozarks have a long history of man-caused fires dating back to the Indian habitation. Here fire has been used as a tool for field and forest management and as a weapon against one's enemies.

2. Wildland Fire Suppression

All unwanted wildland fires will be suppressed.

3. Prescribed Fire

A minimum program of prescribed fires would be initiated to evaluate fire as a tool to maintain some of the open fields and pine groves. These prescribed fires will be conducted to gather vital research information that will be used to establish the prescription necessary to accomplish the objectives of using fire as a management tool.

E. ACHIEVING MASTER PLAN AND RESOURCE MANAGEMENT PLAN OBJECTIVES THROUGH THE FIRE MANAGEMENT PLAN

With proper planning and execution, prescribed fire can manipulate vegetation to produce healthier habitats as a background for the river area. At the same time fuel management, using both mechanical means and prescribed fire, can reduce the risk to the cultural and historic resources and NPS infrastructure on BNR. Implementation of the FMP will achieve both Master Plan and RMP objectives listed under items C and D above.

F. FMP PROGRAM STATEMENT

The FMP is a detailed description of the actions necessary to carry out fire management policies and achieve both Master Plan and RMP objectives. Legal mandates related to the unit's establishment are also supported by the FMP. Further development of the prescribed fire program will assist in reducing levels of hazardous fuels, thereby reducing the risk of large, catastrophic fires; providing an acceptable level of safety to visitors and employees; and providing increased defensibility of NPS infrastructure on BNR

III. SCOPE OF WILDLAND FIRE MANAGEMENT PROGRAM

A. BUFFALO NATIONAL RIVER FIRE MANAGEMENT GOALS

The primary goals for BNR's fire management program are:

- To promote a program that ensures firefighter and public safety.
- A reduction in human-caused fires.
- Ensure appropriate suppression response capability to meet expected fire complexity.
- Increase use of prescribed fire for restoration of fire dependent ecosystems and to reduce hazard fuels, especially in wildland-urban interface areas on the boundary..

B. WILDLAND FIRE MANAGEMENT ELEMENTS

1. Wildland Fire

a. Suppression – All wildland fires, regardless of cause, will receive an appropriate response. If resource needs exceed BNR's staffing ability, then local resources from volunteer departments will be requested. Memoranda of Understanding with local fire departments are included in Appendix E. Additional resources from the interagency zone coordination center may also be requested.

Suppression strategies will seek to control the spread of wildland fires through direct or indirect attack. Modes of attack will be determined by the on site Incident Commander with consideration given to various fire parameters and an assessment of values at risk including firefighter safety, protection of the visiting public and the potential for fire movement to private property.

Suppression operations are made difficult by the linear nature of the river although numerous roads and trails allow fair access to most areas of BNR. With the increase in residential construction close to the boundary, there is a corresponding increase in potential of fires escaping NPS lands.

b. Wildland Fire Use – There will be no Wildland Fire Use for Resource Benefit on Buffalo National River. This decision is due to the linear nature of the unit juxtaposition of adjacent residential areas and lack of significant lightning ignitions in BNR's fire history.

2. Fuels Management

a. Prescribed Fire – Prescribed fire will be used to reduce fuels loads to protect BNR resources. Fire will also be used to maintain fire dependent habitats and maintain cultural landscapes. Restoration of habitats such as the glades is another use for fire where fire exclusion has caused degradation in habitat quality.

b. Non-Fire Applications – In addition to prescribed fire, mechanical means may be used to reduce hazard fuels. Mechanical treatment may stand-alone or be an interim step prior to application of prescribed fire. Most non-fire work is expected to be near boundaries and near NPS historic structures or infrastructure.

C. DESCRIPTION OF FIRE MANAGEMENT UNITS (FMU)

Four Fire Management Units have been identified at Buffalo National River. They are Wilderness, Natural, Agriculture/Open Fields and Development. Each unit may be further divided into sub-units having similar fire management objectives.

1. Unit I – Wilderness

FMU I, totaling 34,570 acres, is made up of three sub-units; the Upper Buffalo Wilderness, the Ponca Wilderness, and the Lower Buffalo Wilderness. The boundaries of these sub-units are identical to the wilderness boundaries described by Congress and available on maps in the fire management office.

a. Unit Characteristics

Geology – Buffalo National River is located in north central Arkansas within the heart of the Ozark Plateau. Elevations range from a high of 2,385' at Pickert Point to a low of 375' at the river's confluence with the White River. Eons of erosion have sculptured the Buffalo River landscape. Flat-topped ridges are joined by hollows containing rocky slopes and bluffs, which descend to the alluvial flood plains of the Buffalo River. Springs, caves and solution pockets are abundant in this karst topography.

Hydrology – The geology and hydrology of the Buffalo River watershed is unique because of a combination of factors such as karst geomorphology, steep topography, shallow soils and highly interactive ground/surface water. Within the steep terrain of the Ozarks, storm runoff from unpaved roads and cleared land carries both fine and coarse sediments to streams. This can result in unstable stream channels, eroding stream banks, and degraded aquatic habitat. Other non-point source water quality issues are also present in the basin.

The Arkansas Department of Pollution Control and Ecology has designated the Buffalo River and Richland Creek (a tributary) as "Extraordinary National Resource Waters …providing the highest water quality standards and protection through a policy of non-degradation." The water quality of the Buffalo has remained relatively unpolluted due to the large amount of forested land, few point source pollution sources, and a relatively sparse population within the watershed.

Air Quality – The entire river with the exception of the Upper Buffalo Wilderness is a Class II airshed. Upper Buffalo is rated as a Class I airshed requiring closer attention to smoke management issues for prescribed fires.

Vegetation – The vegetative community at Buffalo National River is rich and diverse. The ridges, bluffs, hillsides and valleys provide a variety of habitats supporting over 1500 floral species. The major forest types are the Floodplain, Mixed-Hardwood, Oak-Hickory, Oak-Pine, Cedar Glade and Beech. Different stages of ecological succession are present throughout BNR.

Wildlife – The large number of wildlife species at Buffalo National River reflects the habitat diversity. Wildlife observers have recorded over 54 species of mammals, 250 species of birds and 59 species of fish, along with a multitude of reptiles, amphibians,

insects and other invertebrates. Several animal species with restricted habitat requirements are found here and offer clues to past habitat conditions. These species are discussed in detail in the Resource Management Plan.

T&E Species – Resident species listed as threatened or endangered under the Endangered Species Act include gray, Indiana, and Ozark big-eared bats, and southern bald eagle. Several species, such as the alligator snapping turtle, are candidates for future listing.

Cultural Resources – Archeological and historic resources found within BNR, including the Wilderness FMU, are irreplaceable. Therefore these sites and structures must receive special attention. Guidelines from NPS-28 and other legal mandates will be followed to protect these resources from fire. Due to the scattered nature of sites and sensitivity to disturbance, site locations will be available in the cultural resource office at headquarters.

Several historic zones have been identified as having over 250 historic structures. A number of Historic Districts are included on the National Register of Historic Places. Other resources are constantly evaluated for inclusion. The List of Classified Structures (LCS) includes 257 resources.

There are more than 488 identified archeological sites scattered throughout BNR.

Any and all fire control actions undertaken will minimize the impact on such resources. Personnel taking part in suppression as well as prescribed burns will be briefed on the potential for disturbance of such resources and the protection measures to employ. Prior to prescribed burn operations, BNR will consult federally recognized, affiliated Native American tribes as mandated in legislation and NPS policies., and the State Historic Preservation Office (SHPO) will be advised to meet National Historic Preservation Act (NHPA) Section 106 requirements.

b. Fire Management Goals and Objectives
   - Provide for the safety of suppression forces, visitors and park neighbors.
   - Contain 95% of all wildland fires at less than 5 acres to protect wilderness values.
   - Increase public awareness of the role of fire in natural processes and the use of fire in the restoration habitat through interpretative programs during the prescribed fire season.
   - Protect the visiting public from all wildland fire while continuing to provide quality visitor experiences traditionally found on BNR.
   - Restore fire to all fire dependent habitats within the wilderness area.
   - Restoration of fire dependent native species i.e. warm season grasses and Post Oak (*Quercus stellata*) savanna.

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FMU Objectives for each specifically treated area:
Glades, Glade/forest transition/post oak barrens restoration and maintenance.
- herbaceous layer – increase cover of native species by 40%
- reduce stem density by 60%
- reduce new growth eastern red cedar by 95%
- reduce dead/down fuel accumulations by 20%

c. Management Considerations
   - Aircraft resources will be allowed when needed for life protection.
   - The use of mechanized equipment such as bulldozers, engines, ATVs, chainsaws, leafblowers, and pumps in suppression or prescribed fire operations

is not permitted except in cases of life protection and only with prior approval of the park superintendent.
- During wildland suppression actions that require ground disturbance a trained archeologist must be consulted and may be on-site.
- All appropriate cultural clearances will be obtained as part of the planning process for planned ignited prescribed fires.
- Prescribed fires will not occur during countywide or Arkansas Forestry Commission (AFC) established burn restrictions.
- Maintain Class I or II air quality standards as appropriate.
- Maintain aquatic and riparian health and function.

d. Historic Role of Fire

Prior to European settlement the Osage Indians were the primary inhabitants of the Ozark Plateau region. The Osage maintained a hunting-gathering-farming economy, with hunting being the primary method of subsistence. Written accounts strongly suggest the use of fire by Indians to burn off prairies. This was done to encourage the emergence of lush new grasses, grazed by free-ranging elk and bison, and to drive wildlife toward hunters. Goodspeed documented a written account of Indians using fire in 1889 in the History of Northwest Arkansas :

> "Annually, after this rank growth of vegetation became dead and dry, the Indians set fire to it, and burned it from the entire surface of the country. . . . This they did to destroy the places of concealment for wild game, the better to enable them to secure their prey. This burning of the decaying vegetation also destroyed the germs of sprouts and thus prevent the growth of young timber."

With the advent of European settlement, fire played an important role in the development of the agrarian economy. Fire was used to clear land, renew pastures, encourage wildlife habitat and reduce tick and chigger populations. Its use was so prevalent that, in 1830, Missouri was denied a grant of land from the United States to raise timber on the basis that:

> "…it is only necessary to keep out the fires to cover the prairies with timber by the operations of nature."

Today, the landholders of the Ozark Plateau region still use fire for the same reasons. This traditional use of fire is reflected in the fire history data collected at BNR.

Over the last 20 years (1982-2001) the River has averaged 17 wildland fires per year burning about 485 acres. The largest single wildland fire in the period was 1,470 acres in 2000. During the analyzed period, 52 of 346 wildland fires (15%) were over 50 acres in size, some including acreage on adjoining lands.

Lightning is still a factor in the fire regime. The Sylamore Ranger District of the Ozark National Forest adjoins the park on the southeast boundary, and averages 1.5 lightning fires per year

e. Wildland Fire Management Situation

(1). Climate – Buffalo National River has hot summers and mild winters. Precipitation at Harrison averages 46 inches per year. March, May and June are the wettest

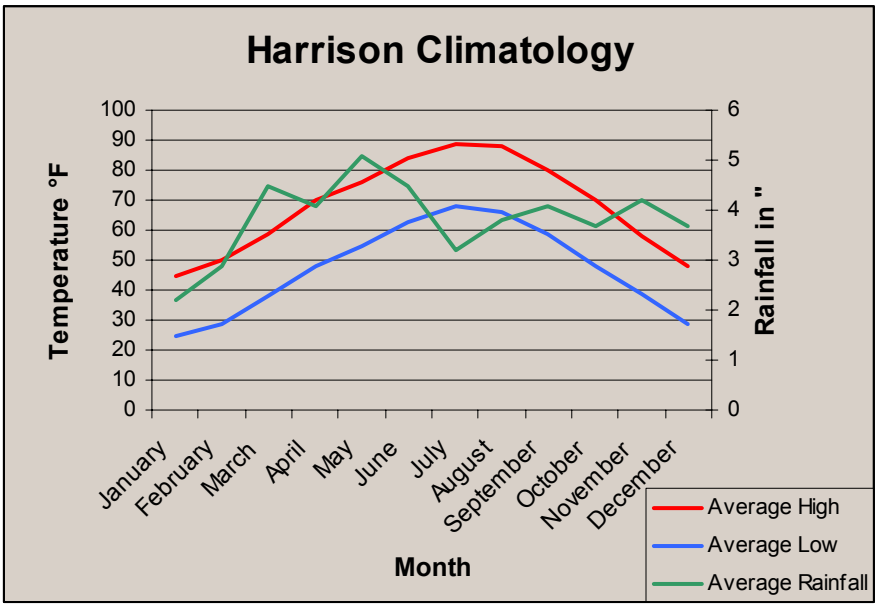
months, January and February are the driest months. Snowfall averages 12 inches per year. Temperature records at Harrison run from -13 F to 107 F.

At other locations on the River, the maximum-recorded precipitation is 82.3 inches in 1927 and the minimum 30.3 inches in 1901. Recorded temperatures have varied from 114 F to minus 23 F, with an average annual temperature of 58 F

Summers are long providing an average growing season of 199 days from early April to late October. Thunderstorms, ice, hail, occasional tornadoes and wet winter snowfall and ice storms cause considerable damage to vegetation from limb and bole breakage. Due to elevation differences from the upper to lower end of the river, data from any intermediate site would reflect different extremes in temperature and rainfall.

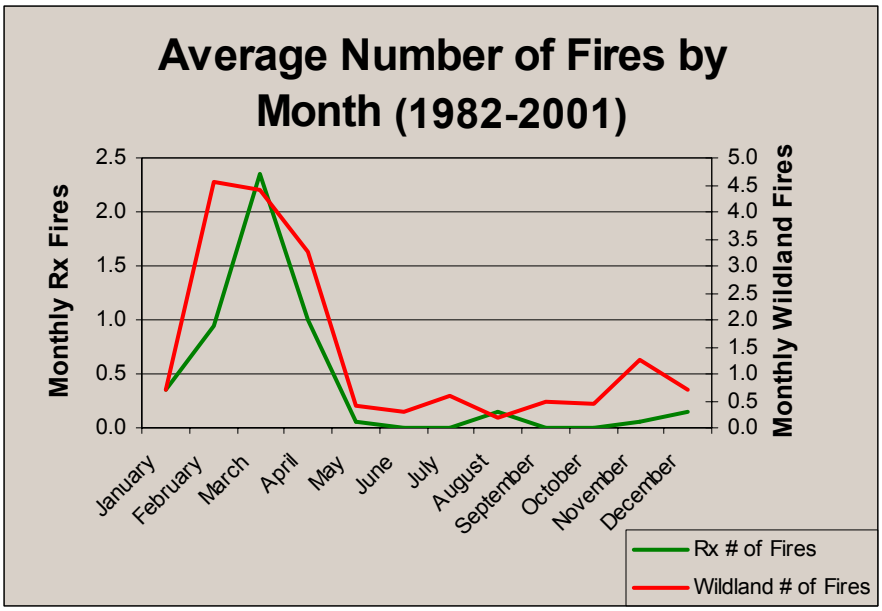
Arkansas experiences periodic droughts, which significantly increases the potential for unwanted wildland fire. A recent example of this extreme occurred in 1980, when the Ozarks experienced high temperatures and low rainfall. Climatological data from Harrison (about mid-way in elevation and river distance) is shown in the chart below.

Figure 1 – Harrison Climatology



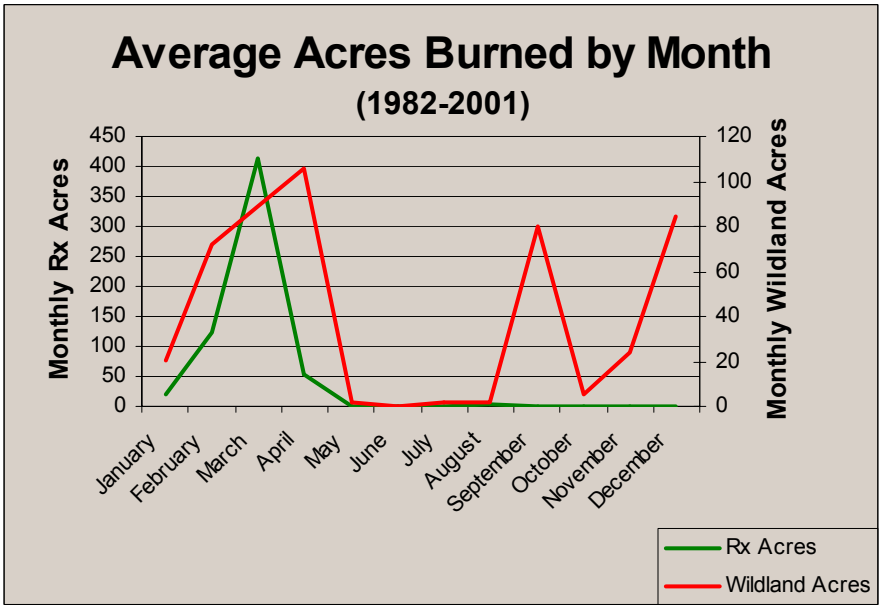
(2). Fire Season – The wildland fire season at Buffalo National River, based on an analysis of fire occurrence during 10-day periods, is from February 11 to April 20 and November 1 to January 20 of each year. Wildland fires have occurred during every month of the year, primarily due to arson. Figure 2 below shows the annual average number of fires, both prescribed and wildland

Figure 2 – Average Monthly Fire Count



Prescribed fire operations can be conducted during any month but the peak season at BNR is during March. As fire effects monitoring information becomes available, seasonality of prescribed fire application may change to better achieve desired results. In addition, a change in season (example; from spring to summer) of some prescribed fire would reduce the potential for air quality problems when the park and the Forest Service are conducting prescribed fire in the same window of opportunity. This is particularly important for air quality in the Upper Buffalo Wilderness Area. Figure 3 below shows the average acreage burned, both by prescribed fire and wildland fires.

Figure 3 – Average Acres Burned Monthly



(3). Fuel Characteristics – Vegetative fuel loads at Buffalo National River have been determined to be light to moderate. A 1985 University of Oklahoma study calculated the fuel loading within three vegetation types. The forest floor accumulations were found to be 6.2 tons/hectare (t/ha) for cedar glade and 18.8 to 38.8 t/ha for the deciduous and oak-pine associations.

The primary fuels of concern are those light fuels found on fields and on forest edges. The usual forest fuel is categorized as National Fire Danger Rating System Model E (NFFL Model 9; Hardwoods - winter) while fields and other open areas are considered Model A (NFFL Model 1, Western Annual Grasses) (Deeming, J.E. et al, 1977). Typically, the period from late September through early April shows the most action fires on or adjacent to the unit. While most fires occur in grassy fuels, leaf fall in the forest lands contribute to an increased potential in the dormant season timeframe. An added fuel problem occurs occasionally resulting from ice storm damage. This causes an additional load of 10 and 100 hour fuels which in turn increases the resistance to control and mop-up problems. Infestations of Gypsy moth (*Lymantria dispar*) and Red Oak borer (*Enaphalodes rufulu*s) have changed the complexion of the vegetative community resulting in increased fuel loads in some areas.

Table 1 – NFDRS Fuel Model Distribution

NFDRS Fuel Model	Acres
C-Open Pine w/Grass	4,144
E-Hardwoods Winter	83,535
T-Sagebrush-grass	5,300
Total	**92,979**

Critical fire behavior variables, such as flame length, rate of spread, and fireline intensity are estimated using the BEHAVE computer software and Northern Forest Fire Laboratory (NFFL) fuel model 9 as this is the predominant fuel (Anderson, H.E., 1982, Rothermal, 1983). Predictions are also shown for model 2 (timber – grass and understory), model 1 (shortgrass), and model 8 (closed timber litter) which are found in several areas of this FMU. The following tables (2-9) display this information:

Table 2 – NFFL Fuel Model 1 – Average Fire Behavior

Inputs		Outputs	
Fuel Model	1	Rate of Spread (chains/hour)	52
1 hour fuel moisture	8	Heat/Unit Area (BTU/ft²)	84
Mid-Flame Wind Speed (mph)	4	Fireline Intensity (BTU/ft/s)	81
Slope (%)	0	Flame Length (feet)	3.4

Table 3 – NFFL Fuel Model 1 – Extreme Fire Behavior

Inputs		Outputs	
Fuel Model	1	Rate of Spread (chains/hour)	446
1 hour fuel moisture	3	Heat/Unit Area (BTU/ft²)	103
Mid-Flame Wind Speed (mph)	16	Fireline Intensity (BTU/ft/s)	844
Slope (%)	0	Flame Length (feet)	10.0

Table 4 – NFFL Fuel Model 2 – Average Fire Behavior

Inputs		Outputs	
Fuel Model	2	Rate of Spread (chains/hour)	19
1 hour fuel moisture	8	Heat/Unit Area (BTU/ft²)	444
10 hour fuel moisture	10	Fireline Intensity (BTU/ft/s)	155
100 hour fuel moisture	12	Flame Length (feet)	4.6
Live herbaceous moisture	150		
Mid-Flame Wind Speed (mph)	4		
Slope (%)	0		

Table 5 – NFFL Fuel Model 2 – Extreme Fire Behavior

Inputs		Outputs	
Fuel Model	2	Rate of Spread (chains/hour)	376
1 hour fuel moisture	3	Heat/Unit Area (BTU/ft²)	550
10 hour fuel moisture	6	Fireline Intensity (BTU/ft/s)	3795
100 hour fuel moisture	9	Flame Length (feet)	19.9
Live herbaceous moisture	75		
Mid-Flame Wind Speed (mph)	16		
Slope (%)	0		

Table 6 – NFFL Fuel Model 9 – Average Fire Behavior

Inputs		Outputs	
Fuel Model	9	Rate of Spread (chains/hour)	8
1 hour fuel moisture	8	Heat/Unit Area (BTU/ft²)	343
10 hour fuel moisture	10	Fireline Intensity (BTU/ft/s)	48
100 hour fuel moisture	12	Flame Length (feet)	4.8
Mid-Flame Wind Speed (mph)	5		
Slope (%)	5		

Table 7 – NFFL Fuel Model 9 – Extreme Fire Behavior

Inputs		Outputs	
Fuel Model	9	Rate of Spread (chains/hour)	80
1 hour fuel moisture	3	Heat/Unit Area (BTU/ft²)	448
10 hour fuel moisture	6	Fireline Intensity (BTU/ft/s)	661

Inputs		Outputs	
100 hour fuel moisture	9	Flame Length (feet)	8.9
Mid-Flame Wind Speed (mph)	16		
Slope (%)	5		

Table 8 – NFFL Fuel Model 8 – Average Fire Behavior

Inputs		Outputs	
Fuel Model	8	Rate of Spread (chains/hour)	2
1 hour fuel moisture	8	Heat/Unit Area (BTU/ft²)	173
10 hour fuel moisture	10	Fireline Intensity (BTU/ft/s)	6
100 hour fuel moisture	12	Flame Length (feet)	1
Mid-Flame Wind Speed (mph)	5		
Slope (%)	5		

Table 9 – NFFL Fuel Model 8 – Extreme Behavior

Inputs		Outputs	
Fuel Model	8	Rate of Spread (chains/hour)	8
1 hour fuel moisture	3	Heat/Unit Area (BTU/ft²)	223
10 hour fuel moisture	6	Fireline Intensity (BTU/ft/s)	33
100 hour fuel moisture	9	Flame Length (feet)	2.3
Mid-Flame Wind Speed (mph)	16		
Slope (%)	5		

NFFL model 9 fires are primary fires on BNR. While both model 1 and 2 fires spread more rapidly and have longer flame lengths under both average and extreme conditions, most grass areas are relatively small in area. The shift in fuel models at forest edges tends to improve suppression circumstances.

Fires in hardwood litter (FM 9) generally consume leaf litter and may top-kill small trees up to five inches in diameter (Brown, J.K., 2000, Rowe, J.S., 1983). During extreme weather much of the overstory can also be scorched with a potential to be killed, particularly with the large accumulation of 100-hour fuels that have developed from extensive sprouting after logging and years of fire protection. In the summer hardwoods fire effects are generally less severe, except many top-killed trees do not sprout as well after summer fires. No hardwood crown fires have been observed on the River, but surface fires are frequent.

In the cedar glades, conditions tend to be dry year round and fire behavior would be driven by fuel moisture and to a lesser degree by wind. With fuel loads ½ to ⅓ of the values in hardwood forests and areas involved smaller, less fire damage is expected.

(4). Fire Regime Alteration – In a research study of the fire history for Buffalo National River, Johnson and Schnell (1985) found data for protohistoric times scarce due to

unavailability of old hardwoods, pines and cedar trees for fire scar examination. A separate study conducted in south-central Missouri determined the fire return interval for protohistoric times as being every two to three years at any given site. Guyette (1994) reported the mean fire interval at Turkey Mountain in the Lower Buffalo Wilderness of 5.7 year for the past 223 years. Guyette and Stambaugh (2002) found the fire return intervals ranging from less than 2 years to 28 years, the highest number coinciding with the period of fire suppression since BNR was established (1972). Researchers generally believe the forests of the Buffalo River country were more extensive during protohistoric times, indicating a fire interval greater than 3 years, but less than 9 years.

Johnson and Schnell (1985) recommended the following fire return intervals based on slope and aspect. It was suggested that steep slopes should burn every 10-15 years; level and gentle slopes every 20-25 years; and north facing slopes every 30-40 years. Guyette and Stambaugh (2002) examined the relationship between fire frequency and population increases between 1680 and 2000 in what is now the Lower Buffalo Wilderness. Mean fire intervals for four anthropogenic fire regime stages were found to range from 1.6 during the Euro-American settlement period to 7.7 years during the Native American Period. Guyette (1994) recommended frequent (2 - 6 years) prescribed fire application during a savanna/woodlands restoration phase, then allowing occasional recruitment of oak and hickory sprouts into the canopy with burns spaced at 10 –20 years.

(5). Control Problems –Access for fire suppression through BNR is only fair to poor. A number of major roads cross the river and provide some access close to the crossing points. In many areas access is restricted to old county roads and trails. The response time is generally longer than desirable because of these factors. Some wildland fire suppression equipment is available at each district on the River. Requests are in place for equipment updates to provide safe and reliable equipment for wildland fire response. While the Federal Fire Policy is very concerned about the movement of fire from Federal to private lands, the larger concern on Buffalo National River is movement onto the unit from private lands.

The sprawling nature of BNR unit requires cooperative efforts with local fire departments, the Ozark National Forest and AFC. During some seasons the nearest NPS fire personnel that could provide assistance to district personnel are at Pruitt, as much as 60 miles and 2+ hours driving time away. Copies of Cooperative Agreements are found in Appendix E.

(6). Values to Protect – T&E species are not expected to be affected by most wildland fires (Smith, J.K., 2000). During both suppression and prescribed fire operations, efforts will be made to minimize disturbance of cultural or archeological sites. If possible an archeologist or cultural resource specialist should be available on-site for these operations. Complete descriptions of locations and resources at risk are found on GIS maps and in other plans.

Prescribed fire operations in and near the Upper Buffalo Class I airshed will make every effort to avoid or minimize adverse air quality impacts. Few wildland or prescribed fires burn for more than one operational period so effects are expected to be temporary and short-term.

Adjacent landowners are most at risk because of the difficulty of access BNR boundaries in the Wilderness FMU. Communication during wildland and prescribed fire operations is critical to minimizing adverse effects.

2. Unit II – Agriculture/Open Fields

FMU II includes all agriculture lands under special use permit, use and occupancy and scenic easement reservations, and fields within the park identified by the open fields management plan. The agricultural fields as well as the development zones are identified on a map found in the fire management office. The exact boundaries of the open fields are based upon the Open Fields Management Plan (November, 1987 –currently under revision).

a. Unit Characteristics – See Section III.C.1.

b. Fire Management Goals
- Provide for the safety of suppression forces, visitors and park neighbors.
- Contain 95% of all wildland fires at less than 5 acres to protect resource values.
- Increase public awareness of the role of fire in natural processes and the use of fire in the restoration habitat through interpretative programs during the prescribed fire season.
- Protect the visiting public from all wildland fire while continuing to provide quality visitor experiences traditionally found on the unit.
- Maintain scenic vistas with fire on a 5-10 year cycle.
- Encourage native species diversity, especially warm season native grasses, while discouraging exotic species.

FMU Objectives for each specifically treated area
- wildlife – Maintain/restore/intro native grass species
- Increase percent cover of native species by 25%
- cultural/historic - Maintain historic farmstead openings
- establish monitoring photopoints
- maintain woody species density at 90% of preburn level within open fields
- reduce dead/down fuel accumulations by 20%

c. Management Considerations
- Aircraft resources will be allowed when needed for life protection.
- The use of tracked vehicles in suppression or prescribed fire operations is not authorized.
- Engines may be restricted from areas identified as possessing a significant hazard to engine and crewmembers if operated off road. (i.e. in heavy brush and/or boggy areas that engines may be trapped in.)
- During wildland suppression actions that require ground disturbance a trained archeologist should be consulted and may be on-site.
- All appropriate cultural resources clearances will be obtained as part of the planning process for prescribed fires.
- Prescribed fires will not occur during countywide or AFC established burn restrictions.
- Maintain Class I or II air quality standard.
- Maintain aquatic and riparian health and function

Historic Role of Fire – The areas included in the Agriculture/Open Fields FMU have been largely influenced by the inhabitants, first Native American and then European, that subsisted in them. The “human system” may or may not have been burned solely for agricultural purposes

e. Wildland Fire Management Situation – See Section III.C.1.e except as presented below.

(3). Fuel Characteristics – The primary fuels of concern in this unit are fine, grassy, fuels. NFFL model 3 provides the best estimate of fire behavior.

Critical fire behavior variables, such as flame length, rate of spread, and fireline intensity are estimated using the BEHAVE computer software and Northern Forest Fire Laboratory (NFFL) fuel model 3 as this is the predominant fuel in the FMU. The following tables display predicted behavior variables:

Table 10 – Fuel Model 3 – Average Fire Behavior

Inputs		Outputs	
Fuel Model	3	Rate of Spread (chains/hour)	77
1 hour fuel moisture	8	Heat/Unit Area (BTU/ft²)	689
Mid-Flame Wind Speed (mph)	4	Fireline Intensity (BTU/ft/s)	975
Slope (%)	0	Flame Length (feet)	10.7

Table 11 – Fuel Model 3 – Extreme Fire Behavior

Inputs		Outputs	
Fuel Model	3	Rate of Spread (chains/hour)	712
1 hour fuel moisture	3	Heat/Unit Area (BTU/ft²)	900
Mid-Flame Wind Speed (mph)	16	Fireline Intensity (BTU/ft/s)	11743
Slope (%)	0	Flame Length (feet)	33.5

Based on the BEHAVE runs, only those historic objects on or within 2 cm of the surface are expected to be affected by wildland fire passing over them. Those effects would vary depending on the composition of the article and soil temperature, soil moisture and other factors. It is generally thought that fire has passed over the landscape numerous times with minimal effect. In addition, these sites are disturbed and significant damage is likely to have occurred prior to acquisition. More damage is likely to be done to artifacts during suppression operations than by the fire itself.

Effects on vegetation are not expected to be significant. Some mortality of shrubs and small trees at the edge of open areas is expected and desired. Grasses and forbs will not be affected as resprouting from roots and rhizomes is the normal situation,

Wildlife populations will be affected slightly by both fire and smoke. The effects will be temporary, lasting for perhaps 6-24 hours after the passage of the flame front. Large animals are not expected to show mortality. Some small mammals such as field mice and voles may be caught by the flame front but mortality is not expected to be heavy (Kelleyhouse, 1979). Regeneration of vegetation provides an excellent habitat for these small species and natural reproduction will quickly repopulate the area (Schramm, et al, 1983).

Ground dwelling reptile and insect populations are not expected to be affected. For ground nesting birds, the seasonal timing for fires may be critical for some species although a relatively small percentage of any one habitat will be treated in a season.

Wildlife populations will be affected slightly by both fire and smoke. The effects will be temporary, lasting for perhaps 6-24 hours after the passage of the flame front. Large animals are not expected to show mortality. Some small mammals such as field mice and voles may be caught by the flame front but mortality is not expected to be heavy (Kelleyhouse, 1979). Regeneration of vegetation provides an excellent habitat for these small species and natural reproduction will quickly repopulate the area (Schramm, et al, 1983).

Ground dwelling reptile and insect populations are not expected to be affected. For ground nesting birds, the seasonal timing for fires may be critical for some species although a relatively small percentage of any specific habitat will be treated in a season.

(4). Fire Regime Alternation – As this is a human system, the natural fire regime has undergone alteration. Prescribed fire application could assist in its conversion to native warm-season grasses.

(5). Control Problems – Access to open fields is generally rated as good, although distances from equipment storage locations may be a problem with wildland fires. A number of fields and agriculture areas are close to boundaries and thus the risk of fire moving from the River to private land is higher.

The sprawling nature of the unit requires cooperative efforts with local fire departments, the Ozark National Forest and AFC. During some seasons the nearest NPS fire personnel that could provide assistance to district personnel are at Pruitt, as much as 60 miles and 2+ hours driving time away. Copies of Cooperative Agreements are found in Appendix E.

(6). Values to Protect – Protection of lands adjacent to the boundary of this FMU will be high priority for protection. Communication during wildland and prescribed fire operations is critical to minimizing adverse effects.

T&E species are not expected to be affected by most wildland fires. During both suppression and prescribed fire operations, efforts will be made to minimize disturbance of cultural or archeological sites. If possible an archeologist or cultural resource specialist should be available on-site for these operations. Complete descriptions of locations and resources at risk are found on GIS maps and in other plans.

Prescribed fire operations near the Upper Buffalo Class I airshed will make every effort to avoid or minimize adverse air quality impacts. As most open areas are relatively small, fire effects are expected to be temporary and short-term.

3. Unit III – Development

FMU III includes all structures and associated landscaped areas located within the park boundary and on severance lands. These structures include, in part; residential homes, historic buildings, cabins, maintenance facilities, barns, sheds, campgrounds, picnic areas, information stations, radio towers, discovery sites, bulletin boards, signs, and utility poles. In addition, those lands adjacent to agricultural or residential lands outside the park boundary are included.

a. Characteristics – See Section III.C.1.a.

b. Fire Management Objectives

- Provide for the safety of suppression forces, visitors and park neighbors.
- Contain 95% of all wildland fires at less than 5 acres to protect values at risk including adjacent lands and improvements.
- Increase public awareness of the role of fire in natural processes and the use of fire in the restoration habitat through interpretative programs during the prescribed fire season.
- Protect the visiting public from all wildland fire while continuing to provide quality visitor experiences traditionally found on BNR.

c. Management Constraints
- Aircraft resources will be allowed when needed for life protection.
- The use of bulldozers in suppression or prescribed fire operations is not authorized.
- Engines may be restricted from areas identified as possessing a significant hazard to engine and crewmembers if operated off road. (i.e. in heavy brush and/or boggy areas that engines may be trapped in.)
- During wildland suppression actions that require ground disturbance a trained archeologist must be consulted and may be on-site.

d. Historic Role of Fire – See Section II.C.1.d.

e. Wildland Fire Management Situation – See Section III.C.1.e except as presented below.

(3). Fuel Characteristics – Fuels in this FMU can generally be classified as NFFL model 1 (short grass). Much of the area is either maintained as lawn or receives maintenance mowing. During the late fall and early spring, fuels may be dry enough to burn, the remainder of the year fuels are green enough to burn poorly. Fuel model 9 may also be present in this FMU.

Tables 2 and 3 for model 1, and tables 4 and 5 for model 9, show expected fire behavior for dry fall or spring conditions prior to active growth (green-up). Critical fire behavior variables, such as flame length, rate of spread, and fireline intensity are estimated using the BEHAVE computer software and Northern Forest Fire Laboratory (NFFL) fuel model 1 as this is the predominant fuel. Model 9 is included as it is the next most abundant fuel in the FMU.

Expected Fire Effects – Based on the BEHAVE runs, only those historic objects on or within 2 cm of the surface are expected to be affected by wildland fire passing over them. Those effects would vary depending on the composition of the article and soil temperature, soil moisture and other factors. As this FMU consists of disturbed sites it is unlikely that significant damage to artifacts would occur.

Effects on vegetation are not expected to be significant. Grasses and forbs will not be affected as resprouting from roots and rhizomes is the normal situation.

(4). Fire Regime Alteration – This is a human system and there is no historic role of fire.

(5). Control Problems – Access to most of the FMU is good. Ranger district initial attack forces are generally located close by and response time is usually short. Local volunteer fire departments are usually available close to most of the FMU and will be backup for NPS suppression personnel.

(6). Values to Protect – Cultural resources, NPS infrastructure, and utilities are among the values to be protected. The nature of the FMU indicates that T&E species, other wildlife species and most plant communities will not be affected. Tables 12 and 13 show general locations and number of cultural resources at risk.

Table 12– Historic Sites and Building Count

Site	# of Units
Boxley Valley Historic District	250
CCC Facilities at Buffalo Point	7
Cold Springs School	1
Eva Barnes Henderson Farm	3
Parker-Hickman Farm at Erbie	9
Rush Historic District	7
Sod Collier Farm	3
Total	**280**

Table 13 – Archeological Areas and Site Counts

Area	Site Count
Big Buffalo Valley Archeological District	47
Calf Creek Archeological Site	1
Identified, Non-inventoried Sites	439
Rush Site	1
Total	**488**

Table 14 lists NPS real property and values as well as value of remaining inholdings protected.

Table 14 – NPS Real Property and Value

Site	# of Units	Value
Boxley/Ponca (Public)	99	1,608,000
Boxley/Ponca (Private)	86	1,452,000
Buffalo Point	36	674,000
Compton	1	50,000
Erbie	6	48,000
Hasty	3	20,500
Hathaway Mountain	1	50,000
Kyles Landing	1	2,500
Point Peter	1	50,000
Pruitt/Ozark	18	188,000
Rush	2	5,000
Silver Hill	7	31,900
Steel Creek	8	36,500
Toney Bend	4	23,000
Tyler Bend	14	1,934,635
Woolum	1	18,000
Total	**288**	**6,192,035**

4. Unit IV – Natural FMU

FMU IV represents all land within Buffalo National River not described under the other three units. (See maps in Fire Management Office). This unit is further broken down into three sub-units based upon vegetative associations. They are; Floodplain/Beech, Mixed-Hardwood/Oak-Hickory, and Oak-Pine/Cedar-Glade.

Fire is recognized as a natural force and will be used as a tool to benefit plant and animal populations, especially to fire-dependent species. Prescriptions for each of the vegetative associations will be developed through a specific prescribed fire plan, which must be approved by the Superintendent.

a. Characteristics – See Section III.C.1.a.

b. Fire Management Goals
- Provide for the safety of suppression forces, visitors and park neighbors.
- Contain 95% of all wildland fires at less than 5 acres to protect resource values.
- Restore fire to all fire dependent habitats within the FMU.
- Use fire to manage fuel loads, especially where visitation exists.
- Increase public awareness of the role of fire in natural processes and the use of fire in the restoration habitat through interpretative programs during the prescribed fire season.
- Protect the visiting public from all wildland fire while continuing to provide quality visitor experiences traditionally found on the unit

Specific FMU Objectives for each specifically treated area
Forest oak/dry woodland
- reduce tree density to open vista with a target density of 30-50 trees/acre
- reduce stem density by 60%
- reduction reduce live stems/ac by 60 %
- reduce dead/down fuel accumulations by 20%

Cane communities
- Maintain or increase cane community size
- maintain edge effect of cane community within 100% or more of pre-burn cover
- encourage nesting for neo-tropical migrants (Swainson's Warbler)

c. Management Considerations
- Aircraft resources will be allowed when needed for life protection.
- The use of bulldozers in suppression or prescribed fire operations is not authorized.
- Engines may be restricted from areas identified as possessing a significant hazard to engine and crewmembers if operated off road. (i.e. in heavy brush and/or boggy areas that engines may be trapped in.)
- During wildland suppression actions that require ground disturbance a trained archeologist should be consulted and may be on-site.
- All appropriate cultural resources clearances will be obtained as part of the planning process for prescribed fires.
- Prescribed fires will not occur during countywide or AFC established burn restrictions.
- Maintain Class I or II air quality standards as appropriate.
- Maintain aquatic and riparian health and function

d. Historic Role of Fire – See Section III.C.1.d.

e. Wildland Fire Management Situation – See Section III.C.1.e.

IV. WILDLAND FIRE MANAGEMENT

A. GENERAL MANAGEMENT CONSIDERATIONS

1. GMP Direction

There is no current General Management Plan. The Final Master Plan for Buffalo National River provides general guidance for managing BNR's natural resources related to the use of fire.

Maintenance of scenic vistas and wildlife habitat is a primary concern. The role of fire in plant succession and perpetuation of native species is also a primary consideration. Protection of cultural resources is necessary to meet legal and management mandates.

The direction provided by the Master Plan indicates that prompt, aggressive suppression actions will be the normal response to wildland fires at BNR. Prompt action will help protect the native species, historic resources, cultural resources and NPS infrastructure

2. Implementation Procedures

Wildland Fire Management will be conducted in accordance with the policies and guidelines provided in NPS DO-18 (1998), NPS RM-18 (1999), and the Interagency Standards for Fire and Fire Aviation Operations 2003 (2003).

As Wildland Fire Use is not an option under this FMP, full suppression action is expected with due consideration to firefighter and visitor safety. A Wildland Fire Implementation Plan (WFIP) is not needed. In cases of multiple fires however, completion of the WFIP may assist management in setting priorities for suppression or determining a confinement strategy.

Should multiple fires occur, priority will be assigned to those fires that threaten BNR infrastructure, cultural resources, and other values at risk identified in Section III.C. When multiple fires occur, lower priority fires may be managed within natural or man-made barriers until sufficient suppression forces are available to take more aggressive action.

B. WILDLAND FIRE USE

Wildland Fire Use will not be considered for implementation under this FMP at Buffalo National River. This decision is based on several criteria:

- Few naturally occurring fires.
- The linear nature of the unit.
- A high potential for escape.

C. WILDLAND FIRE SUPPRESSION

1. Fire Behavior

Fire behavior expected under both average and extreme conditions for the major fuel types on the unit can be found in the tables in Section III.C.1 of this plan.

2. Preparedness Actions

a. Prevention – The objectives of BNR's fire prevention program are: to prevent human caused wildland fires and, to incorporate prevention messages into interpretive programs. Community outreach by the Prevention and Education Specialist is key to successful prevention efforts. The Fire Prevention Plan is found in Appendix J.

b. Annual Training – Annual refresher training emphasizing safety will be made available to BNR staff. Minimum training will include LCES, Standards for Survival, fire shelter training and other updates as appropriate and applicable to National Policy. In addition, each year the Chief of Resource Management and Fire Management Officer will assess the current qualifications of the unit's fire qualified personnel. From this assessment, current and future training needs for both the unit and individuals will be determined. Training will be obtained in the most cost-effective manner through services of the Arkansas Group Fire Management Office or through interagency training courses. Qualified instructors will be utilized for all courses.

c. Readiness – All firefighters and fire support personnel will meet the criteria identified in the Interagency Standards for Fire and Fire Aviation Operations 2003 ("Red Book") (http://www.fire.blm.gov/Standards/redbook.htm) prior to being issued a Red Card. Each year prior to and after the fire season, the Engine Foreman will conduct an inventory of the District fire caches. Any needed supplies or equipment will be requested through the Fire Management Officer. The Engine Foreman will also be responsible for ensuring that unit fire tools and engines are maintained in a state of readiness, especially during the fire season.

d. Fire Weather and Fire Danger

(1). Weather Stations – The weather station is station number 031201, located in the Middle Buffalo Ranger District at Silver Hill, Arkansas. NFDRS Model E is the selected model for fire danger predictions. This station is automated and can be polled for current conditions as needed.

(2). NFDRS – BUFF uses NFDRS Model E, Burning Index (BI) as the primary trend monitoring index and fire danger prediction scale. The Step-up Plan in Appendix H shows the break points for each individual staffing class along with the actions, both preparedness and prevention, required in each class. Additional breakpoints are included for model L, Western Perennial Grasses and for model R, Hardwoods (summer). Model R is used during the peak of summer weather if conditions appear dry enough to offer a fire threat.

(3). Monthly Risk Analysis – When weather and fuels appear to be outside the expected parameters, a monthly risk analysis will be conducted by the FMO. The items considered will include the items in Table 15. Results should be passed on to the regional FMO for compilation and use for requesting additional funds and/or resources for wildland fire suppression. Information developed from this analysis may be used to modify actions planned under various staffing classes in the Step-up Plan.

Table 15 – Monthly Risk Analysis

Factor	Current Level	Historic Average
Temperature Levels (Highs)		
Temperature Levels (Lows)		

Factor	Current Level	Historic Average
Precipitation Levels		
Keetch-Byram Drought Index		
1000 hour Fuel Moistures		
Live Fuel Moistures		
Unusual Weather Events Ice storms, hard freezes		N/A
Unusual fire load		
30-90 day temperature forecast		
30-90 day precipitation forecast		

e. Step up Plan – The Step up Plan provides a guide to follow as fire danger indices increase. Specific actions and trigger points are listed in the table in Appendix H.

Weather observations will be taken at the fire weather station at Silver Hill, AR daily via the automated weather station. NFDRS fuel model E will be used as the primary model for rating fire danger. Weather observations and fuel measurements will be taken each burning period, and the NFDRS BI computed. Specific actions and trigger points are listed in the Step-up Plan in Appendix H.

3. Pre-attack Plan

This is basically a checklist of items to be considered and located prior to wildland fire occurrence. Preparation of items determined necessary for suppression operations will make for a smoother transition if off-park resources are needed. The table is divided into four parts that correspond to four of the functions found in the Incident Command System and is found in Appendix G. When NFDRS indices indicate a Staffing Class of 4 or 5 the pre-attack plan should be reviewed and appropriate actions taken.

4. Initial Attack

a. Setting initial attack priorities involves determining the FMU involved, risk of fire to visiting public and firefighters, resources at risk, existing fires and threat to adjoining property. With multiple ignitions, the FMUs by priority are: Development, Agriculture/Open Fields, Natural and Wilderness. Within each FMU a set of priorities also exists and are listed in the sections below.

(1). FMU I, Wilderness FMU – All fires will be aggressively suppressed with due consideration of firefighter and public safety. Priority will be given to fires threatening adjacent residential property. Second priority will be given to visitor use areas and third to identified cultural resource locations in unoccupied habitats.

(2). FMU II, Agriculture/Open Fields FMU – Fire threatening adjacent residential property or easements will receive the first priority for suppression in this FMU and will be aggressively attacked. Known cultural resources will receive second priority and will be protected from suppression action damage to the greatest extent possible.

(3). FMU III, Development FMU – This FMU contains many NPS buildings and other infrastructure. Because visitors may be present in concentration, fires in this FMU will receive the top priority for initial attack if fires in other FMUs are reported simultaneously

(4). FMU IV, Natural FMU – Priorities in this FMU will mirror the priorities in the Wilderness FMU.

Maps of developed areas, and cultural resources are available in the fire management office.

b. Normally initial attack crews will be comprised of at least two qualified persons fully equipped with personal protective equipment. A radio and tools such as rakes, backpack pumps, etc., will be carried in all patrol trucks. Additional gear such as fire engines, pumps, hose, fuel, etc. may be provided by back-up crews as needed. Allocation of personnel will be accomplished with a minimum of disruption to district visitor services or operations. In order to effectively meet this objective, other NPS personnel off-park personnel will be used when necessary to supplement District personnel for initial attack, and project fire operations.

Small fires will be controlled, if possible by an initial attack handcrew. An initial attack crew on a larger fire will be reinforced by additional firefighters. In most cases an effort should be made not to tie up a number of crews on one fire to the point that the remainder of the park is left under-staffed. If additional personnel or equipment are needed on the fire, the Incident Commander will notify the BNR Fire Program Assistant or FMO who will arrange for additional suppression forces and/or cover crews to be available for initial dispatch.

When wildland fires occur in areas where there is a immediate threat to life and property, the I.C. may request a tractor plow from AFC or the U.S. Forest Service without delay. However, tractor plows should not be utilized without the concurrence of the superintendent if possible. Should a tractor plow be requested the superintendent or designee must be notified immediately. If a wildland fire threatens known cultural resources, the Incident Commander will notify cultural resource staff to document impacts.

c. Confinement as an Initial Attack Suppression Strategy – Confinement strategies may be used in all FMUs except the Development FMU if, in the opinion of the Initial Attack Incident Commander, direct suppression would put firefighters at risk due to terrain considerations, lack of adequate IA staffing or other safety issues.

If a confinement strategy is considered, it should be supported by completion of a Wildland Fire Implementation Plan (WFIP).

d. Response Times – For most fires, response time by NPS equipment and personnel will run up to 60 minutes depending on location of fire and responding personnel. Response to FMU I (Wilderness FMU) may be significantly longer.

e. Management Constraints – The suppression tactics to be used at BNR include use of water or foam firelines in conjunction with natural barriers to reduce damage potential from suppression actions. Water will normally be supplied by engines operating generally from established roads and/or trails. There are three primary management constraints:
- Safety of fireline personnel, the visiting public and park neighbors will be the highest priority in all wildland fire operations.
- The routine use of bulldozers or heavy equipment in suppression operations may be authorized by the Superintendent or designee.
- Engines will be restricted from areas identified as potentially affected by vehicle traffic where rutting, soil compaction or other habitat damage could occur.
- Handlines will be constructed only in areas where damage to cultural resources is not likely to occur.

f. Local Issues – Close communication with local units of government, adjacent landowners, and permittees should reduce wildland fire controversy to a minimum. There are no tribal issues.

5. Extended Attack and Large Fire Suppression

a. Extended attack needs – Based on the fire history from 1982, few fires will remain uncontrolled past the first burning period. The largest fire on BNR was 1,470 acres in 2000.

AFC personnel will respond under a Memorandum of Understanding (mutual aid) if resources are available and not committed to their own suppression activities. The park provides reciprocal assistance to AFC.

The U.S. Forest Service and the National Park Service provide mutual support under a Cooperative Agreement that has eliminated cross billing between agencies for such assistance (Appendix E)

For large fires requiring large numbers of personnel or other resources, contact with the Arkansas-Oklahoma Interagency Coordination Center will bring any necessary resources from sources nationally. The current contact information is found in Appendix E.

b. Implementation Plan Requirements – A Wildland Fire Implementation Plan will not be required on initial attack fires. WFSA development will be required at the point where the second burning period will not see control of fire spread. At this point a WFSA will be completed each day until the fire is surrounded by firelines or natural or other barriers that will stop fire spread.

c. Complexity Decision – When a WFSA has been completed for use during the operations on a second burning period, the fire will be considered to be an extended attack fire.

d. Delegation of Authority – A sample delegation of authority to an incident commander is included in Appendix E.

6. Exceeding Existing WFIP

If the periodic reassessment of a WFIP indicates that a change in strategy is needed, the following actions will be taken:

a. If the fire is the result of an escaped prescribed fire, A Wildland Fire Situation Analysis will be completed and a new strategy selected based on the results.

b. If the initial attack appropriate management response was a confinement strategy and operations continue beyond the second operational period, a WFSA will be completed and new strategy selected if appropriate.

7. Minimum Impact Suppression Tactics (MIST)

Director's Order #18 states that: "Methods used to suppress wildland fires should minimize impacts of the suppression action and the fire, commensurate with effective control and resource values to be protected." Specific restrictions are listed in IV.C.4.e.

8. Fire Rehabilitation

On this unit the only rehabilitation needs anticipated are those associated with fireline construction and mop-up activities. Proper placement of hand constructed firelines should reduce the need for major work. Areas with handlines will be restored to their pre-fire condition as soon as possible. The nature of fires on the unit indicates that long-term rehabilitation should not be necessary. Should a Burned Area Rehabilitation Team (BAR) be required on the unit a hydrologist and an archeologist should be part of the team. Following are park specific guidelines:

- Trash will be removed from lines, camp locations and other staging areas.
- Should waterbars be necessary they will be installed every 70-200 feet for slopes 0 to 15%, 50-70 feet for 15-30%, and 30-50 feet for 30+% slope.
- Stumps will be cut within 3 inches of the ground.
- All snags or trees felled will be lopped and the branches scattered.
- Rehabilitation will occur before resources are released from the fire to the greatest extent possible.

9. Records and Reports

The Superintendent is ultimately responsible for fire reporting and fiscal accounting. Individual report assignments may be made by the Superintendent. The table below is a checklist of possible wildland fire documents and the individual usually responsible for completing them.

Table 16 – Checklist of Wildland Fire Documentation

Checklist of Wildland Fire Documents and Reports		
Document	**Revision or Preparation Frequency**	**Responsible Party**
DI-1202	Each incident	Incident Commander
WFSA	As needed	Unit management/IC
Fire Weather	Daily in season	FMO
Fire Situation Report	Daily in season	FMO
Fire Danger	Daily in season	FMO
Fire Complexity Analysis	Per Incident as Needed	Incident Commander
Monthly Risk Analysis	Monthly	FMO/Chief of Resource Management
Pre-Attack Plan	Annually	FMO/Chief of Resource Management
Wildland Fire Critique	Each Incident	On site suppression staff

Time and filing deadlines are associated with each of these reports and will control scheduling and response times.

V. FUELS MANAGEMENT

A. LONG-TERM FUELS MANAGEMENT

Prescribed fire has been in use at Buffalo National River since the mid-1980's. Continued use of prescribed fire will maintain historic landscape scenes. One of the primary management objectives for BNR is to maintain its unique scenic quality. To maintain these scenic qualities through time, some type of disturbance must exist to set back the succession of some plant communities, while stimulating the regeneration of others.

Plant communities associated with the bluffs and ridges reflect the past influences of fire. Prairie grasses and pines occupy the drier sites and have evolved with mechanisms to withstand fire. Fire-dependent (oak-pine, and cedar-glade) and fire-tolerant (oak-hickory) plant associations are found scattered throughout BNR. Detailed descriptions of these habitats are found in the Wildland and Prescribed Fire Monitoring Plan in Appendix F. Without the disturbance of fire, the pine, cedar and grasses would eventually be replaced by more dominant oaks.

To maintain the scenic qualities so unique to BNR, fire is needed to perpetuate these communities. Prescribed fire provides the most natural and economic means to accomplish these park objectives.

Vegetation is regularly impacted by ice storms and wind events on BNR, resulting in fuel loads many times greater than would normally be seen. These fuel complexes can influence and enhance fire behavior and result in control problems for firefighters when unplanned wildland fires occur.

The reduction of hazardous fuels, especially in the vicinity of BNR boundaries, cultural resources, and infrastructure, has also been a goal of past prescribed fire projects.

The use of prescribed fire along the NPS boundary can reduce the likelihood of wildland fire coming from adjacent lands and threatening BNR resources as well as protecting adjoining private lands from fires starting on BNR lands.

As needed, mechanical fuel reduction will take place in the vicinity of historic structures, NPS infrastructure and other locations where prescribed fire is not the appropriate tool.

Fuels management will meet the Master Plan goals of perpetuating resources, maintaining scenic openings, providing habitat for wildlife and maintaining plant succession.

B. PRESCRIBED FIRE PLANNING

1. Annual Preparation

A schedule of proposed burns will be developed and reviewed annually. The annual review will determine if fuels conditions are such that burn implementation can take place. As part of the review, past burn areas will be examined to determine if the burn objectives over the long term are being achieved. Adjustments to return intervals, prescription parameters and climate conditions will also be reviewed.

2. Long-term Prescribed Fire Relation to FMU's

Four FMU's exist at BNR. All of the items discussed in Section A. above support the prescribed fire program. Burn units within the FMU's are not yet fully identified as some

areas require additional evaluation to determine the appropriate fuel management or vegetative manipulation level of effort.

3. Personnel Requirements

As part of the Arkansas Group, the Buffalo National River Fire FIREPRO staff is expected to be the primary fire personnel source. Other fire qualified personnel from BNR and other NPS Arkansas Group units may be asked to assist as needed. The burn boss and the FMO will develop specific burn plans with input from BNR staff.

4. Fire Behavior and Fire Effects Monitoring

A Monitoring Plan is in the final stage of completion and will be included as Appendix F. Fire weather data used in development of prescriptions is routinely entered into the Weather Information Management System (WIMS). This information provides some inputs for the BEHAVE modeling tool. An on-site monitor will take and record weather and fire behavior observations hourly during the execution of the burn. When combined with the information gathered on fire effects, a reasonably complete view of the success or failure of the operation should emerge.

5. Critique of Prescribed Fire Operation

The following items, as a minimum, will be reviewed following each prescribed fire operation.

- Were any unsafe acts noted?
- Were burn objectives met within an acceptable range of results? :
- What should be done differently to obtain desired results or get better results?
- Was there any deviation from plan? If so, why?
- Was prescription appropriate?
- Were weather changes a factor in accomplishing burn?
- Problems and general comments

6. Documentation and Reporting

The following table lists the reports and other documents required for prescribed fire operations.

Table 17 – Checklist of Prescribed Fire Documentation

Checklist of Prescribed Fire Documents and Reports		
Document	**Revision or Preparation Frequency**	**Responsible Party**
FIREPRO Project Submission	Annual	FMO
Original Signed Prescribed Fire Plan	Each Project	FMO
Checklist of Pre-Burn Prescribed Fire Activities (no specific form)	Each Project	Prescribed Fire Burn Boss
Compliance: NEPA,NHPA, Section 106, Native American Consultation	Each Project	FMO
All Reviewer Comments	Each Project	Reviewers
All Maps	Each Project	FMO\Prescribed Fire Burn Boss
Notification Checklist	Each Project	Prescribed Fire Burn Boss
Permits such as burn, smoke, etc.	Each Project	FMO\Prescribed Fire Burn Boss
Monitoring data	Each Project	Prescribed Fire Monitor
Weather forecasts	Each Project	FMO\Prescribed Fire burn Boss
Agency Administrator Go/No-Go Pre-Ignition Approval	Each Project	Superintendent
Operational Go/No-Go Checklist	Each Project	Prescribed Fire Burn Boss

Checklist of Prescribed Fire Documents and Reports		
Document	**Revision or Preparation Frequency**	**Responsible Party**
Incident Action Plan(s)	Each Project	FMO\Prescribed Fire Burn Boss
Unit logs, Daily Validation or other unit leader documentation	Each Project	FMO\Prescribed Fire Burn Boss
Press Releases, Public Comments, and Complaints	Each Project	Local Park Staff
Smoke dispersal information	Each Project	FMO\Prescribed Fire Burn Boss
Post fire analysis (Critique)	Each Project	All Participants in Operation
Fire Occurrence (DI-1202) report (Must also be reported in SACS)	Each Project	Prescribed Fire Burn Boss

Time and filing deadlines are associated with each of these reports and will control scheduling and response times.

7. Historic Fuel Treatments

The map depicting historic treatments will be a part of the GIS as information on fuel treatments is added to the system.

C. PRESCRIBED FIRE BURN PLAN

Prescribed fire plan requirements at Buffalo National River are similar to the requirements at other NPS units. A detailed outline and discussion is found in RM-18, Chapter 9, Exhibit 15 (http://www.nps.gov/fire/fire/policy/rm18/index.htm). BUFF plans have the following specific requirements:

- Signature Page
- Executive Summary
- Description of Area
- Goals and Objectives
- Risk Management
- Project Complexity
- Organization
- Cost
- Scheduling
- Pre-burn Considerations
- Ignition and Holding Actions
- Wildland Fire Transition Plan
- Protection of Sensitive Features
- Public and Firefighter Safety
- Smoke management
- Interagency Coordination and Public Information
- Monitoring
- Post Fire Rehabilitation
- Reporting Needs
- Appendices
  - Reviewer Comments
  - Technical Reviewer Checklist and Comments
  - Project Map
  - Prescribed Fire Complexity Rating Worksheet
  - Fire Modeling Outputs
  - Holding Resources Worksheet
  - Agency Administrator GO/NO-GO Pre-ignition Approval
  - Prescribed Fire Operations GO/NO-GO Checklist

D. EXCEEDING PRESCRIBED FIRE PLAN

In instances where the Wildland Fire Transition Plan is implemented, a Wildland Fire Situation Analysis (WFSA) will be completed and suppression action will be initiated based on the outputs from the WFSA.

E. AIR QUALITY AND SMOKE MANAGEMENT

1. Air Quality Issues

Under the provisions of the Clean Air Act (PL 88-206, as amended), (http://www.epa.gov/oar/oaq_caa.html) Buffalo National River is classified as a Class II Area. A small section located in the extreme southwest corner of BNR is Class 1 Area. Short-term adverse conditions may exist during periods of prescribed burning or wildland fire.

As Buffalo National River is crossed by several major highways, smoke is a primary concern, both with wildland and prescribed fires. BNR is also bounded primarily by private lands and with a 230 mile perimeter, effects of smoke on private lands can be a major concern. Both air quality and smoke management must be considered in developing prescribed fire plans. Under both wildland fire and prescribed fire conditions there will be times when visibility of BNR's scenic vistas will be temporarily impacted.

The State of Arkansas currently relies on voluntary smoke management guidelines to address air quality/smoke management issues relative to prescribed fire. No permits are presently required prior to igniting a prescribed fire. Despite the lack of enforced regulations, all prescribed fire plans will be developed to lessen potential adverse impacts on local highways and unit neighbors.

2. Smoke Management

Every effort will be made to conduct burning operations with a goal of avoiding impacts on sensitive targets downwind from the operation. Spot weather forecasts and on site weather observations can help the prescribed burn boss determine if a burn should be ignited. Careful observation of fuel moisture and other fire behavior factors can also assist in mitigating smoke problems. Other management actions including mop-up of heavy fuels can also reduce smoke production. All future state air quality regulations will be observed on prescribed fires.

Due to the canyon-like topography along portions of the river, close attention will be given to weather conditions that could transport smoke downstream. Areas normally beyond the expected smoke dispersal area could be adversely affected.

a. Class I Airsheds – The Upper Buffalo Wilderness Area is located adjacent to the west end of the River. Prescribed fire planned for the area within 5 miles of the wilderness may temporarily affect visibility. The short duration of most prescribed fries in the area will mitigate impacts as will a prescription with adequate parameters to promote rapid smoke dispersion.

b. Smoke Sensitive Areas – There are more than 10 communities adjacent to BNR, each of which is a potentially smoke sensitive area. Maps showing the potential targets; hospitals, nursing homes, airports etc. are available in the Fire Management Office. Campgrounds and other visitor facilities are also targets. Specific caves known to provide habitat for T&E bat species may also be considered to be smoke sensitive.

Smoke management guidelines frequently used by the US Forest Service recommend identifying all sensitive areas downwind of and within 10 miles for backing fires, 20 miles of head fires or large burns (over 250 acres), or 30 miles for logging debris or slash fires. Since there are no logging operations on NPS property, only targets within 20 miles are mapped. Smoke management and dispersion parameters mentioned in Section a above will be part of prescribed fire planning for all prescribed fires on BNR.

c. Local/Regional Smoke Restrictions – There are no current restrictions, however, the amount of prescribed fire applied by the agencies in the river basin does have potential to create problems which might be solved by restriction or regulation. A cooperative effort to manage smoke from prescribed fires is ongoing.

d. Mitigation Strategies

(1). Planned prescribed fires – Fires to improve resource values will have a smoke dispersion component in the prescription. If smoke creates a prolonged hazard or significant nuisance, appropriate actions will be taken to mitigate the condition causing the problem or the fire will be suppressed.

(2). Suppression – Suppress or mop up smoldering fuels when they are likely to generate smoke management "problems."

(3). Ignition – Ignite smoldering fuels to get them to burn with an active flame, which generates less than half the emissions than smoldering combustion. Flaming combustion also generates convection columns, which raise smoke above ground level.

(4). Types of Fires – Use backing fires when possible.

(5). Dispersion – Recognize poor dispersion conditions that will last several days, such as the predicted passage of a slow-moving warm front; a lingering high pressure system with stable atmosphere; or high humidity conditions, and adjust burning strategies as necessary.

(6). Residual Smoke – When a fire has burned for an extended period of time and generated a lot of residual smoke, the NPS will consider appropriate actions to minimize additional smoke production.

(7). Firefighter Safety – During high smoke production phases of a prescribed fire operation, crews will be rotated out of high smoke areas.

(8). Sensitive Areas – Planned prescribed fire ignitions in sensitive areas will be done either when visitation is low, or the Superintendent will restrict entry to areas potentially impacted by smoke.

e. Guidelines – The following are the management guidelines for all phases of the fire management program.

- No prescribed fires will be ignited during air pollution alerts, temperatures inversions or when a burn ban has been established by any local government.
- Fire weather forecasts will be used to predict smoke dispersal.
- Burning will be done only when conditions result in rapid smoke dispersal.
- Proper firing techniques to lower smoke production will be utilized.
- Timing of prescribed fires will occur after 9:00 am with ignition ending one hour

before sunset.
- Smoke projection maps will be prepared to assist in projecting smoke dispersal patterns.
- Local police and fire agencies will be notified of any planned prescribed fire so they may provide any needed assistance with traffic flow should problems with smoke dispersal occur.
- Prescribed fires will be planned and conducted when proper wind flow will disperse smoke over unpopulated or low density populated areas.

F. NON-FIRE APPLICATIONS

During the current planning horizon (2002-2007), there are several mechanical hazard fuel treatments planned, some in conjunction with prescribed fire projects on BNR Appendix I). There are no chemical treatments proposed for hazard fuel reduction purposes.

1. Annual Activities

Each project will require approximately 1-½ weeks to prepare project proposals and complete the review process. A request will be made during the prior year for funding to support the project. Much of the actual work can be accomplished by the BNR FIREPRO staff, but opportunities to use personnel from other NPS units or agencies, or to contract the work out, will be considered. A prioritized schedule will be prepared for each field season.

2. Seasonal Restrictions

To protect remnant native vegetation mechanical treatments are best completed prior to the active growth period or after dormancy.

3. Monitoring

Short and long-term monitoring will concentrate on measurements of acres treated and stems removed. If fire is to be applied as a second phase of treatment, monitoring will be as defined in the Wildland and Prescribed Fire Monitoring Plan (Appendix F).

4. Critique of Project

The following items, as a minimum, will be reviewed following each mechanical treatment.
- Were any unsafe acts noted?
- Were treatment objectives met within an acceptable range of results? :
- What should be done differently to obtain desired results or get better results?
- Was there any deviation from plan? If so, why?
- Were weather changes a factor in completing treatment?
- Problems and general comments

5. Cost Accounting

Records of costs associated with the project will be kept by the fire program assistant.

6. Documentation and Reporting

The following table lists the reports and other documents required for prescribed fire operations.

Table 18 – Checklist of Non-Fire Fuel Treatment Documentation

Checklist of Mechanical Fuel Treatment Documents and Reports		
Document	**Revision or Preparation Frequency**	**Responsible Party**
FIREPRO Project Submission	Annual	FMO
Signed Project Plan	Each Project	Superintendent
Project Maps	Each Project	FMO\Project Manager
Notification Checklist	Each Project	Local Staff\Project Manager
Permits	Each Project	Local Staff
On-Site Effects Reporting	Each Project	Monitor
Unit Logs or Other Documentation	Each Project	Local\Project Staff
Contracts	Each Project	Local\Project Staff
Project Critique	Each Project	Project Staff

Time and filing deadlines are associated with each of these reports and will control scheduling and response times.

7. Annual Project List

The list is found in Appendix I

VI. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

A. FIRE ORGANIZATION STRUCTURE

1. Fire Management Officer

   The Fire Management Officer (FMO) will oversee all suppression operations and planned prescribed fires and is responsible for day to day fire management operations at the park level. The FMO also has responsibility for planning training, arranging fitness testing, updating plans, preparing prescribed fire plans, WFSA for escaped wildland or prescribed fires.

2. Education- Prevention-Information Specialist

   The Education- Prevention-Information (EPI) Specialist is involved in public outreach to explain the fire program from both a suppression/prevention viewpoint and a prescribed fire viewpoint. During wildland fire suppression operations, or planned prescribed fires, the EPI Specialist will act as liaison between NPS personnel, other agencies and general public.

3. Fire Program Assistant

   The Fire Program Assistant (FPA) maintains all records for the fire program as well as keeping accounts, FIREPRO submissions, qualification records and fire reports (DI-1202) up to date.

4. Engine Foreman

   The Engine Foreman maintains engines and other fire equipment. The Engine Foreman frequently the initial attack incident commander and provides supervision to seasonal firefighters.

5. Fire Use Module Foreman

   The Fire Use Module (FUM) Foreman supervises the Buffalo National River FUM and leads FUM support for park and interagency prescribed fire implementation.

6. Fire Use Module Program Assistant

   The Fire Use Module Program Assistant provides support for the FUM by processing travel and other administrative documents.

7. Fire Ecologist

   The Fire Ecologist for the Ozark Ecoregion is currently based out of Ozark National Scenic Riverways in Missouri. The Fire Ecologist is responsible for oversight of the fire effects monitoring program at BUFF, and in other supported NPS units. The Fire Ecologist establishes monitoring protocols, maintains the monitoring plan, assists in fire planning, and provides analysis of fire effects data to park fire and resource management staff.

B. FIREPRO FUNDING

FIREPRO funding is available for approved equipment needs and staffing. Project proposals, for prescribed fire, are submitted through normal channels for approval. BNR supports a Fire Use Module that is available to assist other NPS units as a regional and national resource.

A total of 23 individuals (13.2 FTEs) are involved in the BNR fire program and funded by FIREPRO. The permanent staff consists of 6 positions. Seven additional positions are subject to furlough with the remainder seasonal. Staff from BNR also support fire management needs at other Arkansas Group Parks.

C. FIRE ORGANIZATION STRUCTURE RELATED TO PARK ORGANIZATION

1. Superintendent or Designee

The Buffalo National River Superintendent or designee is responsible for the overall program direction. The Superintendent has the final decision making authority for management operations. The Superintendent approves and signs Interagency Agreements pertaining to BNR, and approves WFSA for wildland fires or escaped prescribed fires.

2. Fire Management Officer

The Fire Management Officer will oversee all suppression operations and planned prescribed fires and is responsible for day to day fire management operations at the park level. The FMO position is assigned to the Resource Management Division working under the Chief of Resource Management and coordinates operations with the Resource Management Specialist.

3. Chief Ranger

During any fire operations, wildland fire or prescribed fires, the Buffalo National River Chief Ranger acts as, or assigns, liaison between NPS personnel, other agencies and the general public. The Chief Ranger provides for investigation of human caused wildland fires and security of fire scenes and equipment.

4. Chief of Resource Management

The Buffalo National River Chief of Resource Management supervises aspects of the fire management program including program direction, goals and objectives, prescribed fire planning and rehabilitation.

5. Chief of Interpretation and Cultural Resources

The Buffalo National River Chief of Interpretation and Cultural Resources supervises the historian and the archeologist who prepare the compliance documentation for NHPA, Section 106 and Native American Consultation as mandated in legislation and NPS policies with regard to federal actions which have the potential to effect cultural resources including structures, archeological sites, cultural landscapes, and ethnographic resources such as subsistence and ceremonial locales and sites, structures, objects, and rural landscapes assigned cultural significance by traditional users.

D. Interagency Coordination and Agreements

BNR maintains a good working relationship with local Volunteer Fire Departments, the Arkansas Forestry Commission and the Ozark National Forest.

The Arkansas-Oklahoma Interagency Coordination Center (AOICC) is managed by the Ouachita National Forest and can be contacted for assistance at any time circumstances dictate. This contact will bring any resources necessary to the assistance of the River. The center is located at Hot Springs, AR.

Prescribed fire activities use in adjoining Arkansas Wildlife Management Areas is done cooperatively with Arkansas Fish and Game Commission. An agreement is being developed and will be included in Appendix E when approved.

E. Key Interagency Contacts

HA-RO-CO VFD	Carole Brooks	(870) 448-5841
Jasper VFD	Terry Brasel	(870) 446-2633
Krooked Creek VFD	Gerry Carlton	(870) 743-1800
Morningstar VFD	Richard Groves	(870) 448-5809
PG & S Fire Department	Jerry Willis	(870) 439-2571
Ralph-Caney VFD	Chuck Reimer	(870) 449-5549
Rea Valley VFD	Rick Beel	(870) 449-4741
Ozark NF Fire Staff Officer	Roger Fryar	(501) 964-7293
Ozark NF Sylamore RD FMO	Ronnie Anderson	(870) 269-3228
Ozark NF Bayou RD FMO	Mark Morales	(501) 284-3150
Ozark NF Buffalo RD FMO	Larry Faught	(870) 446-5122
AFC State Fire Chief	Don McBride	(501) 296-1870
AFC District 7 FMO	Eric Curl	(870) 269-3441
Arkansas Oklahoma Interagency Coordination Center (AOICC)	Dewey Watson	(501) 321-5231 (501) 321-5232

F. Fire-related Agreements

Not all local fire departments are signed up with the Rural Fire Assistance Program. The following table lists participating fire departments with the areas protected that have agreements. These agreements may cover other non-law enforcement emergency responses (search and rescue, spills, structural fire, etc.) and are located in Appendix E.

Table 19 – Agreements with Local Fire Departments

Fire Department	Township Protected	Agreement Date
Krooked Kreek Volunteer Fire Department	Krooked Kreek Fire District	7/17/02
Rea Valley Volunteer Fire Department	Rea Valley Fire District	6/22/01
Ralph-Caney Rural Volunteer Fire Department	Ralph-Caney Rural Fire District	3/19/02
PG & S Fire Department	PG & S Fire District	7/17/01
Morningstar Volunteer Fire Department	Morningstar Fire District	5/29/01
Jasper Volunteer Fire Department	Jasper Fire District	6/4/01

Fire Department	Township Protected	Agreement Date
HA-RO-CO Volunteer Fire Department	HA-RO-CO Fire District	6/5/01

VII. FIRE RESEARCH

A. PREVIOUS AND ONGOING FIRE RELATED RESEARCH

Several significant fire related research projects have been conducted on BNR. In a research study of the fire history for Buffalo National River, Johnson and Schnell (1985) found data for protohistoric times scarce due to unavailability of old hardwoods, pines and cedar trees for fire scar examination. Guyette (1994) reported the mean fire interval at Turkey Mountain in the Lower Buffalo Wilderness of 5.7 year for the past 223 years. Guyette and Stambaugh (2002) found the fire return intervals ranging from less than 2 years to 28 years, the highest number coinciding with the period of fire suppression since BNR was established (1972). Researchers generally believe the forests of the Buffalo River country were more extensive during protohistoric times, indicating a fire interval greater than 3 years, but less than 9 years.

Johnson and Schnell (1985) recommended the following fire return intervals based on slope and aspect. It was suggested that steep slopes should burn every 10-15 years; level and gentle slopes every 20-25 years; and north facing slopes every 30-40 years. Guyette and Stambaugh (2002) examined the relationship between fire frequency and population increases between 1680 and 2000 in what is now the Lower Buffalo Wilderness. Mean fire intervals for four anthropogenic fire regime stages were found to range from 1.6 during the Euro-American settlement period to 7.7 years during the Native American Period. Guyette (1994) recommended frequent (2 - 6 years) prescribed fire application during a savanna/woodlands restoration phase, then allowing occasional recruitment of oak and hickory sprouts into the canopy with burns spaced at 10 –20 years.

B. FIRE RESEARCH NEEDS

A large number (15) of research needs were identified by BNR staff. The top five needs are listed below with a brief explanation of the project/need.

1. Updated Vegetation Maps

   These maps will provide information about vegetation changes since the last set of maps. This provides an opportunity to document gains or losses in habitat types important to BNR's mission.

2. Update 1985 Fire History

   An update would document the efficacy of the current prescribed fire program in terms of proper fire return interval. Information produced would improve prescribed fire planning over the expected life span of the FMP.

3. Relationship of Fire to Canebrakes and Neotropical Migrants

   This proposal would document the effects of fire on both canebrakes and neotropical migrant birds. Both the habitat and users of the habitat appear to be declining in extent.

4. Pre-burn Cultural Resource Surveys

   Surveys would provide information to prescribed fire personnel about protection needs during preparation and execution during burns.

5. Effects of Smoke on Cave Habitats

Because bats are frequently found in the caves along the river and there is potential for endangered bats to use those areas, this project would provide information useful in planning prescribed fire near caves.

Other projects proposed generally requested fire effects studies on sensitive species, exotic vegetative species, cultural objects and various miscellaneous studies.

VIII. MONITORING

A program to monitor fire effects is currently in development and a Fire Monitoring Plan has been drafted (Appendix F). The Monitoring of fire weather and behavior during prescribed fire operations is conducted by BNR staff. Short and long term monitoring is conducted by the Ozarks Fire Effects Crew, stationed at Ozarks National Scenic Riverways, under the supervision of the Eco-regional ecologist. Permanent plots are installed to measure vegetation/fuels in designated areas to be treated with prescribed fire. Monitoring Protocols follow NPS' Fire Monitoring Handbook (2001) with modifications as needed. Evaluation of vegetative and fuel conditions will occur prior to any prescribed fire and at designated intervals thereafter. Data gathered from such monitoring will be used to develop future fire prescription parameters to determine the success of prescribed fire meeting the long-term objectives of the Open Fields Management Plan, Wilderness Plan and other documents that define a desired future condition. Efforts will be made to coordinate monitoring efforts with the Heartland Inventory and Monitoring Network.

A. SHORT-TERM MONITORING

A program to monitor fire effects is currently in development. The complete program will become Appendix M to this plan. The existing monitoring program consists of monitoring fire weather and behavior during prescribed fire operations. Evaluation of vegetative and fuel conditions will occur prior to any prescribed fire and at designated intervals thereafter. Data gathered from such monitoring will be used to develop future fire prescription parameters to determine the success of prescribed fire meeting the long-term objectives of the Open Fields Management Plan, Wilderness Plan and other documents that define a desired future condition.

B. LONG-TERM MONITORING

Long-term monitoring is defined as that level of effort required to track changes in vegetative composition changes occurring over a multi-year period. Changes in vegetation will be monitored with the permanent fire effects plots.

C. MONITORING PLAN

The Monitoring Plan discusses in detail the protocols needed to measure changes in vegetation and fuels due to prescribed fire. The monitoring plan defines various monitoring types, based on vegetation attributes and associated management objectives. Specific monitoring protocols are derived for each monitor type to measure those objectives. The plan is found in Appendix F.

IX. PUBLIC SAFETY

A. ISSUES AND CONCERNS

As hazards exist in both wildland and prescribed fires, safety will always be the highest priority. Smoke on roads on and adjacent to BNR is of concern. A significant amount of residential development is located near or adjacent to BNR as well. Smoke from sources on and off BNR can be a safety issue to the visiting public. The flaming front of a fire can, potentially, put unsuspecting members of the visiting public at risk. For this reason, areas affected by fire of any cause will be closed to the public. Adjacent landowners will be notified when fire, particularly wildland fire, is a threat to off-unit residential areas.

B. MITIGATION

In order to make BNR employees and the general public aware of such hazards, the following mitigation measures will be considered:

- General public will be made aware of wildland fires and prescribed fires through press releases and general interpretive presentations.
- The general public will not be allowed access to any areas affected by fire.
- Safety briefings will be conducted for NPS personnel prior to any participation in wildland suppression or prescribed fires.
- Appropriate regulatory and/or enforcement agencies will be notified prior to any prescribed fires to assist in safely managing pedestrian, equestrian or vehicular traffic.
- Warning signs will be posted along roads and trails as necessary.
- All fire personnel will be reminded of the "18 situations that Shout Watch Out" and will be expected to comply with the "10 Standard Fire Orders".

X. PUBLIC INFORMATION AND EDUCATION

A. CAPABILITY AND NEEDS

An excellent opportunity is available for fire information dissemination at each visitor contact area. To further public information and education, the following guidelines will be followed:

- Timely and accurate information will be provided to the media and BNR visitors regarding the status of fire actions and suppression efforts.
- Informational handouts explaining the fire management program will be prepared and updated as necessary. During periods when management fires are burning, these handouts will be distributed to BNR visitors and general public.
- The prescribed fire program will be discussed in informal contacts with all interested or affected BNR personnel, neighbors and visitors.
- Adjacent landowners will be notified when fire, particularly wildland fire, is a threat to residential areas.

B. RESPONSE TO INCREASING FIRE ACTIVITIES

When the staffing class is at SC-4 or SC-5, Information will be prominently displayed at visitor contact points. Patrol activity on BNR will be increased to detect potential fires and to monitor visitor activity. At SC-5 it may become necessary to close portions of BNR to protect the public.

XI. PROTECTION OF SENSITIVE RESOURCES

A. CULTURAL RESOURCES

Archeological, historic, and ethnographic resources found within BNR are irreplaceable; therefore these resources must receive special attention. Guidelines from NPS-28 and other legal mandates will be followed to protect these resources from fire. The BNR staff will conduct pre-project clearance reviews to ensure compliance is met.

The following general measures for protection and mitigation of impacts to cultural resources shall be considered and applied:

- Cultural resource personnel will be consulted during the preparation of burn plans in order to assess the effect on cultural resources in burn areas and to prepare compliance documents.
- Personnel assigned to the prescribed burn operations will be briefed on the potential for disturbance of cultural resources.
- Specific buildings, structures, ruins and sites (including fences and roads) will need to be protected by conducting a pre-burn inventory of above-grade resources.
- Hand cutting of fuel load, including perimeter clearings, which does not impact historic plantings or landscapes.
- Use of wet, “blown”, or raked hand lines (avoiding mineral soil disturbance).
- Foaming or fire resistant wrapping of buildings.
- Exclusion from prescribed burns if practical.
- Post-burn assessments will evaluate the effect of individual burns on cultural resources.
- Post-burn assessments should evaluate the effect of repetitive burns on cultural resources.
- A photographic record will be kept of previously unknown historic sites and archeological materials uncovered during fire management and rehabilitation activities.

1. Archeological Sites

Buffalo National River has numerous identified prehistoric and historic archeological sites scattered throughout the unit. The heat generated from a fire can cause the fracturing of lithic materials lying on or close to the surface. To protect these sites, the following specific actions will be taken:

- The Prescribed Burn Boss (RxB1/2) or Incident Commander (IC) will identify all sites that may be, or have been affected by active fire.
- For wildland fires – The degree of heat penetration into the soil is the primary concern. A fire moving with a high rate of spread and not burning down to the soil will have little effect on lithics. However, if the fire is slow moving and is consuming all fuel to the mineral soil, aggressive suppression will take place if firefighter safety will not be compromised.
- For prescribed fire – If the prescription calls for removal of more than 50% of the ground litter, the site will be excluded from the burn or wetline, foam or other techniques will be used to exclude fire from the site.
- The RxB1/2 will not permit the use of handtools to construct fireline within any known site boundaries.
- If fire has already burned over a suspected site, the RxB1/2 or IC will contact the archeologist to evaluate the site.
- The protection of sites will be done in such a manner as to not permit public disclosure.

- When archeological resources are threatened by a fire, archeologists will be present to help mitigate the impacts of fire suppression and rehabilitation on those resources.
- Priority will be given to monitoring heavy equipment, especially bulldozers and graders, through all aspects of the suppression and rehabilitation efforts.
- Archeologists serving on a fire as technical specialists must hold a current red card to perform specific advisory duties on the fire line.
- Line archeologists will be equipped with appropriate standard firefighting safety equipment.
- Special flagging will be used to identify archeological sites.
- The BNR archeologist will coordinate all activities of line archeologists with fire bosses.

If Native American human remains and/or funerary objects are found during fire operations, the site will be marked and protected. The BNR archeologist will be immediately notified and will, in turn, notify the affiliated Native American tribes in accordance with Sec. 3, Native American Graves Protection and Repatriation Act (NAGPRA).

2. Historic Sites

Buffalo National River has several historic zones and many historic structures. Several Historic Districts are on the National Register of Historic Places and potentially historic structures are being evaluated for inclusion. All structures meeting the above criteria will be protected from fire externally unless a threat to firefighters exists that cannot be adequately mitigated. Other structures or sites will be evaluated by the BNR historian and appropriate protection measures will be determined.

3. Ethnographic Resources

Ethnography is concerned with contemporary peoples associated with Buffalo National River, with their cultural systems or ways of life, and with the related technology, sites, structures, and material features, and natural resources within its boundaries. Ethnographic resources are subsistence and ceremonial locales and sites, structures, objects, and rural landscapes assigned cultural significance by traditional users. Natural resources may have heritage signiificance in activities and beliefs related to, for example, religion, healing, and subsistence. Ethnographic surveys or studies are not currently available for the park due to staffing and funding constraints. When they become available, these resources will be protected from fire externally unless a threat to firefighters exists that cannot be adequately mitigated.

4. Mitigation

Personnel taking part in suppression as well as prescribed fires will be briefed on the potential for disturbance of cultural resources. Any and all control actions undertaken will minimize the impact on such resources; wet line, foam and leaf blowers are the preferred minimum impact suppression techniques. Prescribed fire planning will consider all known resources within a burn unit. No construction of soil disturbing handlines will occur in connection with prescribed fire.

B. NATURAL RESOURCES

1. Resources

The vegetative resources are basically fire adapted given the correct prescription and require no specific protection. Most animal species are not likely to be adversely affected. Bats in caves may be affected by smoke and avoiding smoke impacts will be

part of the prescribed fire planning process. A list of Federally listed Threatened and Endangered Species is found in Appendix C.

2. Mitigation

Until addition information is available, prescribed fire in riparian habitats and canebrakes will be applied as a research tool in limited areas. Caves containing endangered bats will have a 200' buffer to protect them from smoke until further information on effects of smoke on bats is available.

A Resources Management Specialist will review the burn plan and determine if any special wildlife management considerations are necessary. All mitigation requirements will be closely monitored and adhered to by the Burn Boss.

C. INFRASTRUCTURE

1. Resources

NPS buildings on BNR include several maintenance, office and visitor facilities. The estimated value of these improvements in the 2002 FIREPRO run was $6,192,000. Several use and occupancy leases exist within BNR, most are scheduled for closure by 2005. A Boy Scout camp does exist within BNR and is expected to remain indefinitely. Protection of this facility is the responsibility of the Mount Sherman VFD. There are a number of locations with residential development at or near the BNR boundary.

2. Mitigation

Because many BNR facilities are in areas of mowed lawns and not in the woodlands, there are no specific mitigation measures required for those facilities. Other facilities will require some hazard fuel reduction for protection. Following is a partial list of facilities requiring some hazard fuel management for protection: Lost Valley, Steel Creek Ozark House, Pruitt Maintenance and Ranger House, old Pruitt fire cache, Erbie Church. As other needs are identified, hazard fuel reduction projects will be scheduled.

XII. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

A. INTRODUCTION

1. Scope

All wildland fires and fire-related incidents will be reviewed. All prescribed fires will be reviewed as appropriate.

2. Reviews

Reviews are conducted for one or more of the following purposes:

a. To examine the progress of an on-going fire incident and to confirm effective decisions or correct deficiencies.

b. To identify new or improved procedures, techniques or tactics.

c. To compile consistent and complete information to improve or refine park, regional or national fire management programs.

d. To examine anomalous fire-related incidents in order to determine cause(s), contributing factors, and where applicable, recommends corrective actions. If negligence is indicated, the circumstances will be reported and investigated in accordance with applicable regulations, policies or guidelines.

e. To determine the cost effectiveness of a fire operation.

3. Authority

The authority to convene a fire review rests with the park superintendent, regional director, or the Associate Director, Park Operations and Education. It is the clear responsibility of the superintendent to call for a review, to insure timely completion, and to implement recommended actions. The regional director has responsibility to follow-up with the superintendent: that reviews are established and completed in a timely manner, and that recommended actions are completed. The superintendent may request technical support from Fire Management Program Center, regional, park or interagency personnel with the appropriate expertise.

4. Incident Types

All wildland fire incidents which result in human entrapment, fatalities, or serious injuries, or result in incidents with potential, will be investigated and reviewed.

5. Associate Director

The Associate Director, Park Operations and Education, will convene an ad-hoc team to review Service-wide fire management programs subsequent to the occurrence of any significant, controversial or unusual wildland fire management activities.

6. Purpose

All reviews will be conducted as constructive critiques aimed at determining the facts related to the specific fire or fire management program. They will identify commendable actions, techniques and decisions as well as areas which need improvement. Reviews are intended to resolve operational issues, not impose punitive actions.

B. FIRE REVIEWS

1. "Hotline" Review

The purpose of the hotline review is to examine the progress of an on-going fire incident, regardless of size. The review will provide a confirmation of the decisions being made daily in the Wildland Fire Situation Analysis or determine where the decision process has been faulty and corrective actions are needed.

The "hotline" review is normally conducted by the park's fire management officer (or an official who has designated fire program management responsibilities) in conjunction with the incident commander on the fire.

These reviews require no special reporting. Documentation of "hotline" reviews should be included in the normal fire report narrative.

2. Incident Management Team (IMT) Closeout and Review

The park superintendent will conduct a closeout review with the IMT prior to their release from the fire incident. The purpose of this review is to ensure complete transition of the incident management back to the unit and to evaluate the status of any incomplete fire business. RM 18, Chapter 13, Exhibit 1 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) contains a sample Closeout Review with an Incident Management Team.

3. Unit Level Review

The superintendent or his/her designated representative should conduct the unit level review. The superintendent will appoint other qualified persons, including the unit fire management officer (or an official who has designated fire program management responsibilities) to be a part of the review. The purpose of this review is to provide the superintendent with information to recognize commendable actions and to take needed corrective action(s). Costs associated with the review will be charged to the account assigned to the fire with the approval of the regional fire management officer. A copy of the complete report will be sent to the regional fire management officer, who will review it and, if appropriate, forward a copy to the Fire Management Program Center.

4. Regional Level Review

A regional level review may be conducted for any fire that:

a. Crosses a park's boundary into another jurisdiction without the approval of an interagency agreement.

b. Results in adverse media attention.

c. Involves serious injury to less than 3 personnel, significant property damage, or an incident with potential.

d. Results in controversy involving another agency.

The regional level review normally will be conducted at the unit where the fire occurred. The regional fire management officer or his/her designated representative will convene the review. Attendees will include the superintendent of the unit, unit fire management officer (or the official who has designated fire program management responsibilities), the incident commander(s) for the fire, and other individuals agreed upon by the regional director and superintendent. If possible, the review team should visit the actual fire site as part of the review. A copy of the review report will be sent to the Fire Management Program Center. Costs associated with the review will be charged to the account assigned to the fire.

5. National Level Review

A national level review may be conducted for any fire that involves Service wide or national issues, including:

a. Significant adverse media or political interest.

b. Multi-regional resource response.

c. A substantial loss of equipment or property.

d. A fatality, or multiple, serious fire-related injuries (three or more personnel).

e. Any other fires that the Associate Director, Park Operations and Education, wants reviewed.

The national level review normally will be conducted at the unit where the fire occurred. The National Fire Management Officer or his/her designated representative will convene it. It will be attended by the superintendent of the unit, the unit's fire management officer (or an official who has designated fire program management responsibilities), the regional fire management officer, the incident commander(s) for the fire, and other individuals agreed upon by the National Fire Management Officer, the regional director and the superintendent. If possible, the review team should visit the actual site of the fire as part of the review. All costs associated with the review will be charged to the account assigned to the fire.

RM 18, Chapter 13, Exhibit 2 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) provides an outline for final reports of fire reviews. RM 18, Chapter 13, Exhibit 3 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) provides a checklist of sample questions, which might be asked during a fire review. These two documents should be used for unit, regional and national level reviews.

6. Entrapment and Fire Shelter Deployment Review

Fire shelter deployment is defined as the use of a fire shelter for its intended purpose in any situation other than training. Use of the terms "precautionary deployment", "practice deployment" and "entrapment deployment" are not acceptable or recognized. Entrapments and fire shelter deployments will be reviewed in order to gather complete and accurate information to determine the reasons for the deployment. Corrective recommendations will be developed to minimize future situations which might lead to other shelter deployments. All entrapments and fire shelter deployments will be reported to the regional fire management officer, who will be responsible for developing the review team in cooperation with the Fire Management Program Center. The team leader will contact the superintendent for reporting information. See Safety & Health RM 18, Chapter 3 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) for investigation and reporting requirements.

All entrapments and fire shelter deployments will be investigated as soon as possible after the deployment incident. RM 18, Chapter 13, Exhibit 4 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) provides specific directions for conducting an entrapment or shelter deployment review. RM 18, Chapter 13, Exhibit 5 (http://www.nps.gov/fire/fire/policy/rm18/index.htm) provides an outline format for final reports on entrapment and fire shelter deployment reviews.

C. PROGRAM REVIEWS

1. Operations Evaluations

Operations evaluations of NPS units and regions may include review of fire management programs to assure compliance with established Service standards.

2. Annual Fire Program Review

The superintendent will convene an ad-hoc team to review park fire activity during any year in which significant, unusual or controversial fire activity occurs. This review team should analyze the reports from any reviews to determine what, if any, operational changes should be initiated. The review team will develop findings and recommendations and establish priorities for action.

3. FIREPRO Review

Annually, the FMO will conduct a FIREPRO audit and review of the park values at risk, research, equipment and project needs. This review will be completed on the schedule set by the Fire Management Program Center.

4. Fire Readiness Review

Fire readiness or preparedness reviews, utilizing the Interagency Fire Readiness Review Guide as adapted for park-specific needs, should be conducted annually prior to the established fire season by park fire management staff.

XIII. CONSULTATION AND COORDINATION

The following individuals and groups were consulted during the preparation of this plan.

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XIV. APPENDICES

APPENDIX A

A. REFERENCES CITED

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APPENDIX B

B. DEFINITIONS

A consistent list of terms and their definitions has been developed and approved by the NWCG. This list of defined terms includes terms obsolete under the new policy. Additional terms used in this reference guide but not defined by NWCG are from the Fire Effects Information System and other sources. The sources may be found in the References Cited (Appendix A).

Appropriate Management Response – Specific actions taken in response to a wildland fire to implement protection and fire use objectives. This term is a new term that does not replace any previously used term.

Backfire – A fire set along the inner edge of a fireline to consume the fuel in the path of a fire or to change the fire's convection column.

BI – Burning Index. A number related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a particular fuel type within a rating area. An Index for describing Fire Danger.

Climax – A biotic community that is in equilibrium with existing environmental conditions and represents the terminal stage of an ecological succession (Smith 2000).

Cover – The proportion of ground covered by the aerial parts of individuals of a species, usually expressed as a percentage (Grieg-Smith 1983). Total cover for all species on a site can exceed 100%. However, TOP-COVER, the proportion of ground for which a species provides the uppermost cover, cannot exceed 100% (Grieg-Smith 1983). Mueller-Dombois and Ellenberg (1974) consider basal area a special kind of "cover," but FEIS does not usually use COVER in this way.

Crown Fire – Fire that burns in the crowns of trees and shrubs. Usually ignited by a surface fire. Crown fires are common in coniferous forests and chaparral-type shrublands (Brown 2000).

Direct Effects of Fire – Described in FEIS plant species summaries under FIRE EFFECTS; IMMEDIATE FIRE EFFECT ON PLANT and DISCUSSION AND QUALIFICATION OF PLANT RESPONSE.

Duff – Partially decomposed organic matter lying beneath the litter layer and above the mineral soil. Includes the fermentation and humus layers of the forest floor (02 soil horizon) (Brown 2000).

Ecosystem – An interacting system of interdependent organisms.

Expected Weather Conditions – Those weather conditions indicated as common, likely, or highly probable based on current and expected trends and their comparison to historical

weather records. They are the most probable weather conditions for this location and time. These conditions are used in making fire behavior forecasts for different scenarios (one necessary scenario involves fire behavior prediction under "expected weather conditions).

Experienced Severe Weather Conditions – Those weather conditions that occur infrequently, but have been experienced on the fire site area during the period of weather records. For example, rare event weather conditions that significantly influence fires may have occurred only once, but their record can be used to establish a baseline for a worst-case scenario. These are the most severe conditions that can be expected. These conditions are used in making fire behavior forecasts for different scenarios (one necessary scenario involves fire behavior prediction under "experienced severe weather conditions).

Fire Cycle – Length of time for an area equal to the entire area of interest to burn; size of the area of interest must be clearly specified (McPherson and others 1990).

Fire Duration – The length of time that combustion occurs at a given point. Fire duration relates closely to downward heating and fire effects below the fuel surface as well as heating of tree boles above the surface.

Fire Exclusion – The policy of suppressing all wildland fires in an area (Smith 2000).

Fire Frequency = Fire Occurrence – Number of fires per unit time in a specified area (McPherson and others 1990).

Fire Intensity – A general term relating to the heat energy released in a fire. FEIS usually uses more specific terms to describe rate of heat release. See FIRELINE INTENSITY below.

Fire Interval – Time (in years) between two successive fires in a designated area (i.e., the interval between two successive fire occurrences); the size of the area must be clearly specified (McPherson and others 1990).

Fire Management Plan (FMP) – A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire Management Unit (FMU) – Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMU's are delineated in Fire Management Plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire Regime – Describes the patterns of fire occurrence, size, and severity - and sometimes, vegetation and fire effects as well - in a given area or ecosystem (Agee 1994, Mutch 1992, Johnson and Van Wagner 1985). A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured. The fire regime on a particular kind of site or in a particular ecosystem is not cyclic in a deterministic sense; it is, rather, a story about climate, human use, other disturbance, and species dispersion as they have all changed and interacted to affect an ecosystem, both suddenly and subtly, over millennia. The concept of fire regime as story

lets us think about the future in that type or ecosystem as a question, perhaps a choice, rather than a destiny. According to Agee (1994), "A fire regime is a generalized way of integrating various fire characteristics. The organization may be according to the characteristics of the disturbance..., dominant or potential (climax) vegetation on the site..., or fire severity, the magnitude of effects on dominant vegetation...." According to Mutch (1992), "A natural fire regime is the total pattern of fires over time that is characteristic of a natural region or ecosystem. The classification of fire regimes includes variations in ignition, fire intensity and behavior, typical fire size, fire return intervals, and ecological effects." According to Johnson and Van Wagner (1985), "... fire regime is a multivariate system characterized by (i) the fire history measured in fire frequency or fire return period, (ii) fire intensity measured in kW/m, and (iii) depth of burn (duff removed) measured in kg/m, or percent...."

Fire-Resistant Species – Species with morphological characteristics that give it a lower probability of being injured or killed by fire than a FIRE-SENSITIVE species, which has a "relatively high" probability of being injured or killed by fire (McPherson and others 1990). Implies that the organism does not get injured by things that would seem able to injure it (Johnson and Van Wagner 1985). (Rowe (1983) uses a more restrictive definition of resistance - relating it only to plants with aboveground parts that survive fire.)

Fire Severity – Degree to which a site has been altered or disrupted by fire; also used to describe the product of fire intensity and residence time (McPherson and others 1990, Agee 1994, Rowe 1983).

Fire Suppression Specialist – Staff specialist with primary duties of managing the preparedness and suppression programs.

Fire Use – The combination of wildland fire use and prescribed fire application to meet resource objectives

Fireline Intensity – The rate of heat release per unit time per unit length of fire front. Numerically, the product of the heat of combustion, quantity of fuel consumed per unit area in the fire front, and the rate of spread of a fire, expressed in kW/m (McPherson and others 1990).

Flame Length – The length of flames in a fire front measured along the slant of the flame, from the midpoint of its base to its tip. Flame length is mathematically related to fireline intensity and tree crown scorch height (Brown 2000).

FMO – Fire Management Officer.

FMP – Fire Management Plan.

Fuel – Fuel is comprised of living and dead vegetation that can be ignited. It is often classified as dead or alive and as natural fuels or activity fuels (resulting from human actions, usually from logging operations). Fuel components refer to such items as downed dead woody material by various size classes, litter, duff, herbaceous vegetation, live foliage etc. (Brown 2000).

Fuel Continuity – A qualitative description of the distribution of fuel both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread (Brown 2000).

Fuel Loading – The weight per unit area of fuel, often expressed in tons per acre or tonnes per hectare. Dead woody fuel loadings are commonly described for small material in

diameter classes of 0 to 1/4-, 1/4 to 1-, and 1 to 3-inches and for large material in one class greater than 3 inches (Brown 2000).

Fuel Moisture – percent or fraction of oven dry weight of fuel. It is the most important fuel property controlling flammability. In living plants it is physiologically bound. Its daily fluctuations vary considerably by species but are usually above 80 to 100%. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation (Brown 2000).

FWS – U.S. Fish and Wildlife Service, Department of the Interior.

GIS – Geographic Information System

GMP – General Management Plan. A park document that describes broad management goals and objectives for NPS units.

GPS – Geographic Positioning System

Ground Fire – Fire that burns in the organic material below the litter layer, mostly by smoldering combustion. Fires in duff, peat, dead moss and lichens, and punky wood are typically ground fires (Brown 2000).

Hazard Fuel – A fuel complex that, by nature, presents a hazard to socio-politico-economic interests when ignited. The hazard fuel condition can be mitigated through hazard fuel reduction.

Hazardous fuels – Those vegetative fuels which, when ignited, threaten: public safety, structures and facilities, cultural resources, natural resources, and/or natural processes. Also: fuels that permit the spread of wildland fires across administrative boundaries except as authorized by agreement, and fuel accumulations and arrangement may be within the natural range of variability and still be hazardous because of the proximity to values at risk.

Headfire – A fire spreading or set to spread with the wind (National Wildfire Coordinating Group 1995).

ICMR – Incident Commander Multiple Resources

ICSR – Incident Commander Single Resource.

Initial Attack – The first aggressive suppression action taken on a fire, consistent with firefighter and public safety, and values to be protected.

Initial Attack Incident Commander – Leader of first response fire suppression forces.

Ladder Fuels – Shrubs and young trees that provide continuous fine material from the forest floor into the crowns of dominant trees (Smith 2000).

Litter – The top layer of the forest floor (01 soil horizon); includes freshly fallen leaves, needles, fine twigs, bark flakes, fruits, matted dead grass and other vegetative parts that are little altered by decomposition. Litter also accumulates beneath rangeland shrubs. Some surface feather moss and lichens are considered to be litter because their moisture response is similar to that of dead fine fuel.

Long-Term Effects – Effects lasting more than 10 years. (Personal communication (Oct. 21, 1998) with Wendell Hann, Fire Ecologist and assistant to National Fuels Specialist, U.S. Department of Agriculture, Forest Service).

Mast – Fruits of all flowering plants used by wildlife, including fruits with fleshy exteriors (such as berries) and fruits with dry or hard exteriors (such as nuts and cones).

Mean Fire Interval – Arithmetic average of all FIRE INTERVALs determined, in years, for a designated area during a specified time period; the size of the area and the time period must be specified.

Mitigation Actions – Mitigation actions are considered to be those on-the-ground activities that serve to check, direct, or delay the spread of fire; and minimize threats to life, property, and resources. Actions may include mechanical and physical non-fire tasks, specific fire applications, and limited suppression actions. These actions will be used to construct firelines, reduce excesssive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create "blacklines" through controlled burnouts, and to limit fire spread and behavior.

Mixed-Severity Fire Regime – Fire regime in which fires either cause selective mortality in dominant vegetation, depending on different species' susceptibility to fire, or vary between understory and stand replacement (Smith 2000).

MOA – Memorandum of Agreement

MOU – Memorandum of Understanding.

National Fire Danger Rating System (NFDRS) – A widely used system to predict several measures of fire probability and resistance to control.

National Fire Plan (NFP) – A plan prepared by agencies of the U.S. Departments of Agriculture and Interior to reduce adverse effect from unwanted wildland fires.

Natural Fire – Fires ignited by natural means (usually lighting).

NFFL Model – One of the thirteen fuel models used to predict fire behavior using the fire spread formulas developed by Rothermel (1972).

NPS – National Park Service, Department of the Interior.

Organic Soils – Deep layers of organic matter that develop in poorly drained areas such as bogs, swamps, and marshes (Brown 2000).

Preparedness – Activities that lead to a safe, efficient and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination. This term replaces presuppression.

Prescribed Fire – Any fire ignited by management actions to meet specific objectives. Prior to ignition, a written, approved prescribed fire plan must exist, and National Environmental Protection Act requirements must be met. This term replaces management ignited prescribed fire.

Prescribed Fire Plan – A plan required for each fire application ignited by managers. It must be prepared by qualified personnel and approved by the appropriate Agency Administrator prior to implementation. Each plan will follow specific agency direction and

must include critical elements described in agency manuals. Formats for plan development vary among agencies, although the content is identical.

Prescribed Fire Specialist – The staff specialist with primary duties of managing both the prescribed fire and Wildland Fire Used for Resource Benefit (where applicable) programs.

Prescription – Measurable criteria which define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations.

Protohistoric Fire Regime – The time from about 1500 to the mid- to late-1800s, a period when Native American populations had already been heavily impacted by European presence and before extensive settlement by European Americans in most parts of North America, before extensive conversion of wildlands for agricultural and other purposes, and before fires were effectively suppressed in many areas (Smith 2000).

Relict – A biotic community or fragment of a community that has survived some important change, often to become in appearance an integral part of existing vegetation

Resource Management Plan (RMP) – Park planning document that describes natural and cultural management goals and objectives for NPS units.

Sere – A succession of plant communities leading to a particular plant association (Smith 2000).

Short-Term Effects – Effects lasting less than 10 years (Personal communication (Oct. 21, 1998) with Wendell Hann, Fire Ecologist and assistant to National Fuels Specialist, U.S. Department of Agriculture, Forest Service).

Snag – A standing dead tree from which the leaves and some of the branches have fallen (Smith 2000).

Stand-Replacement Fire Regime – Fire regime in which fires kill or top-kill aboveground parts of the dominant vegetation, changing the aboveground structure substantially. Approximately 80 percent or more of the aboveground, dominant vegetation is either consumed or dies as a result of fires. Applies to forests, shrublands, and grasslands (Smith 2000).

Succession – The gradual, somewhat predictable process of community change and replacement leading toward a climax community; the process of continuous colonization and extinction of populations at a particular site (Smith 2000).

Suppression – see Wildland Fire Suppression

Surface Fire – Fire that burns in litter and other live and dead fuels at or near the surface of the ground, mostly by flaming combustion (Brown 2000).

T&E – Threatened and Endangered plants and animals. Also referred to as listed species.

Top-Kill – Kills aboveground tissues of plant without killing underground parts from which the plant can produce new stems and leaves (Smith 2000).

Total Heat Release – The heat released by combustion during burnout of all fuels, expressed in BTU per square foot or kilocalories per square meter (Brown 2000).

Underburn – Understory fire.

Understory Fire Regime – Fire regime in which fires are generally not lethal to the dominant vegetation and do not substantially change the structure of the dominant vegetation. Approximately 80 percent or more of the aboveground dominant vegetation survives fires. Applies to forest and woodland vegetation types (Smith 2000).

Urban Interface – Locating structures (homes, offices, and other developments) in wildland fuel complexes. Also known as wildland-urban interface.

Urban Intermix – Locating structures (homes, offices, and other developments) in wildland fuel complexes. Also known as wildland-urban interface.

USFS – United States Forest Service

Wildfire – An unwanted wildland fire. *This term was only included to give continuing credence to the historic fire prevention products. This is NOT a separate type of fire.*

Wildland Fire – Any non-structure fire, other than prescribed fire, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Wildland Fire Management Program – The full range of activities and functions necessary for planning, preparedness, emergency suppression operations, and emergency rehabilitation of wildland fires, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Wildland Fire Situation Analysis (WFSA) – The decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland Fire Suppression – An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Wildland Fire Use – The management of naturally-ignited wildland fires to accomplish specific, pre-stated, resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. Operational management is described in the Wildland Fire Implementation Plan (WFIP). Wildland fire use is not to be confused with "fire use," a broader term encompassing more than just wildland fires.

APPENDIX C

C. SPECIES LISTS

The following table lists the Federally listed Threatened and Endangered species found on, or with potential to be found on, Buffalo National River.

Table 20 – Federally Listed Threatened and Endangered Species

Common Name	Scientific Name	Listing Status
	Plants	
Eastern Prairie Fringed Orchid	*Platanthera leucophaea*	T
Harperella	*Ptilimnium nodosum*	E
Missouri Bladderpod	*Lesquerella filiformis*	E
No Common Name	*Geocarpon minimum*	T
Pondberry	*Lindera melissifolia*	E
Running Buffalo Clover	*Trifolium stoloniferum*	E
	Mammals	
Gray Bat	*Myotis grisescens*	E
Indiana Bat	*Myotis sodalis*	E
Ozark Big-Eared Bat	*Corynorhinus (=Plecotus) townsendii ingens*	E
	Insects	
American Burying Beetle	*Nicrophorus americanus*	E
	Birds	
Bald Eagle	*Haliaeetus leucocephalus*	T
Least Tern	*Sterna antillarum*	E
Red-Cockaded Woodpecker	*Picoides borealis*	E

Species lists of plants, mammals and birds commonly found on Buffalo National River may be found in the Interactive Species Database at the University of California, Davis.

APPENDIX D

D. NEPA, NHPA, NATIVE AMERICAN CONSULTATION, AND ENDANGERED SPECIES COMPLIANCE

Copy of the EA and documentation of NHPA compliance in form of letter or other document from State Historic Preservation Officer and section 7 consultation to be added here.

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CHAPTER 1 - PURPOSE AND NEED

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of an action proposed by the National Park Service (NPS) to amend the Buffalo National River Fire Management Plan (FMP).

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- National Park Service Conservation Planning, Environmental Impact Analysis, and Decision Making: Director's Order (DO)#12 and Handbook.

The Purpose of an Environmental Assessment (EA)

There are three primary purposes of an EA:

- To help determine whether the impact of a proposed action or alternative could be significant, thus an environmental impact statement (EIS) is needed;
- To aid in compliance with NEPA when no EIS is necessary by evaluating a proposal that will have no significant impacts, but that may have measurable adverse impacts; and
- To facilitate preparation of an EIS if one is necessary.

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials. In this case, the Superintendent of Buffalo National River (BNR) is faced with a decision to amend the park's FMP as described below. This decision will be made within the overall management framework already established in Buffalo National River's Final Master Plan (NPS, 1977) and Resource Management Plan (NPS, 1982). The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the BNR Resource Management Plan (copies of which can be obtained by contacting NPS personnel at the park headquarters in Harrison, Arkansas).

In making decisions about NPS-administered resources, the National Park Service is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, Wilderness Act, National Historic Preservation Act, and Endangered Species Act

(summarized in Appendix C). The authority for the conservation and management of the National Park Service is clearly stated in the Organic Act, which states the agency's purpose: "...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The Buffalo National River was established by Congress in 1972 "*...for the purposes of conserving and interpreting an area containing unique scenic and scientific features, and preserving as a free-flowing stream an important segment of the Buffalo River in Arkansas for the benefit and enjoyment of present and future generations*..." (U.S. Congress, 1972). The enabling legislation additionally stated that fishing and hunting opportunities were to be provided, and that within three years the land area within the boundaries of the Buffalo National River was to be evaluated for possible wilderness designation.

The requirements placed on the National Park Service by these statutes, especially the Organic Act, mandate that resources are passed on to future generations "unimpaired" (DOI, 2001a). This EA addresses whether the actions of the various FMP alternatives proposed by Buffalo National River impair resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other Park Service planning documents (see *Chapter 3 – Environmental* ***Analysis*****).**

1.2 PURPOSE AND NEED

Prior to European settlement of the Ozark Plateau, natural (lightning) and human-caused (Indian) fires would burn in a mosaic pattern guided only by climatic conditions, natural barriers (streams, bluffs) and available fuels. The Osage Indians were the region's primary inhabitants. Written accounts strongly suggest the use of fire by Indians to burn off prairies and to prevent woodlands from becoming cluttered by underbrush (Ladd, 1991). This was done to encourage the emergence of lush new grasses, grazed by free-ranging elk and bison, and to drive wildlife toward hunters. During this era, the fire return interval, or average amount of time between successive wildland fires on any given site, has been estimated at between three and nine years, depending on slope and aspect as well as the weather.

With the advent of European settlement, fire played a significant role in the development of the agrarian economy. It was used to clear land, renew pastures, encourage wildlife habitat and reduce tick and chigger populations. Today, rural residents of the Ozark Plateau region still use fire for the same reasons. This tradition is reflected in the fire history data collected at Buffalo National River.

In the park itself, however, as a result of applying the Federal policy of fire suppression then prevalent throughout the nation, in the first decade after BNR's establishment in 1972 the fire return interval lengthened substantially, from 11 years in the early 1900's to 1973 to 55 years from 1973-1983.

One of the primary management objectives for Buffalo National River is to preserve its unique scenic qualities, including the expanse and variety of its natural and in some cases unique vegetative communities. To maintain these scenic qualities over time, some type of disturbance must intervene to set back the succession of some plant communities, while stimulating the regeneration of others. Fire provides the most natural and economic means of accomplishing these park objectives.

Although the natural accumulation of fuels is not as much a problem at BNR as it is elsewhere, the location of farms, homes and rural communities on private lands adjacent to the park's boundaries raises concerns about the wildland-urban interface. Many of theses areas with potential to burn also have relatively poor access, compounding the risk.

National Park Service Wildland Fire Management Guidelines (DO-18) state that "all parks with vegetation that can sustain fire must have a fire management plan." The purpose of this Federal action is to develop a fire management plan and program at Buffalo National River that utilizes the benefits of fire to achieve desired natural resource conditions while minimizing the fire danger to park resources and adjacent lands from hazardous fuel accumulations. The need for the action is to reduce the accumulation of hazardous fuel levels in the park, preserve native plant communities, and restore species and habitat diversity.

1.3 BACKGROUND

Nestled in the Arkansas Ozarks (Figure 1), Buffalo National River is noted for its recreational, scenic, cultural, and wilderness values. The park's Master Plan (1977) characterized the river as follows:

> "*The Buffalo River is recognized as the central element of the whole array of natural and historical features in its setting. It has clean, clear water uniting all elements in philosophical coherence. Difficult to grasp, but important, it is a symbol of the Nation – a free river preserved to flow through open space for all time as a remnant of our original homeland.*"

Formal recognition of the Buffalo River's outstanding scenic and recreational qualities began with the establishment of Buffalo River State Park in 1935, continued in 1963 with the NPS determining that the river was nationally significant, and culminated in 1972 with the creation of Buffalo National River, 37 years after its initial designation as a state park. The U.S. House of Representatives Committee Report (1972) explained the basis for establishing the Buffalo National River:

"*Because it is a pure, free-flowing stream which has not been significantly altered by industry or man, it is considered to be one of the country's last significant natural rivers. It is not one single quality, but the combination of*

National Park Service
Buffalo National River
Environmental Assessment
Fire Management Plan

its size, its completeness, its wild qualities, and its associated natural, scenic, and historic resources that makes the Buffalo worthy of national recognition."

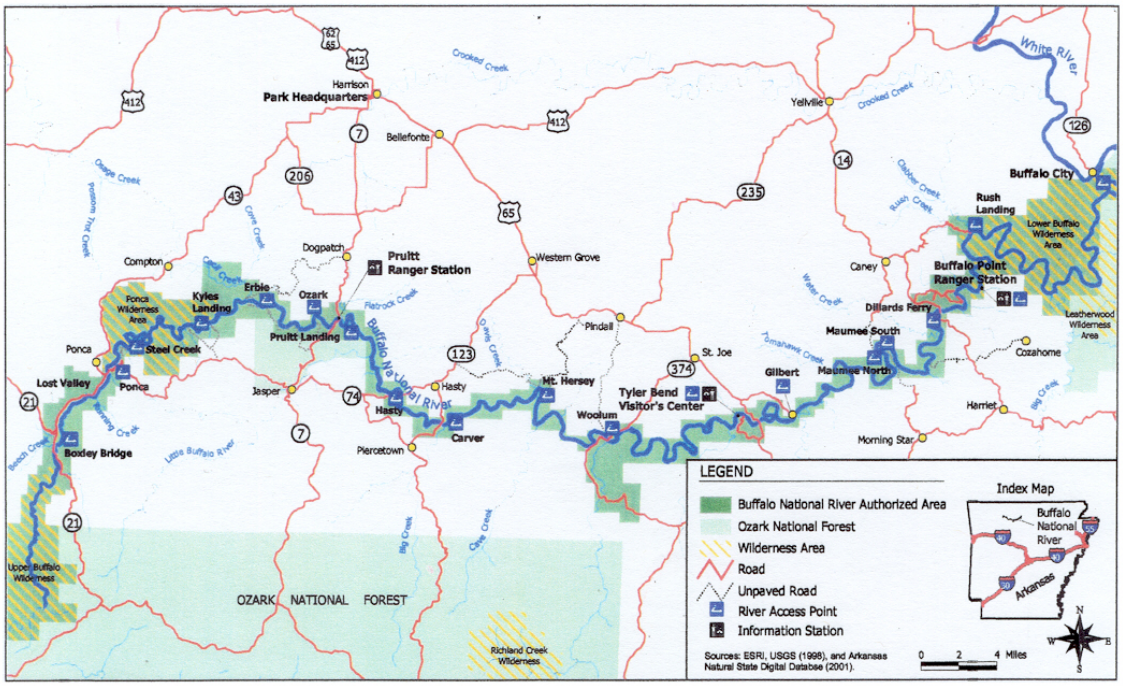

Figure 1 – Vicinity Map of Buffalo National River, Arkansas

1-4

In 1978, over one-third of the National River was included in the National Wilderness Preservation System, and is administered in accordance with the Wilderness Act of 1964. The park is also rich in prehistoric and historic sites. Four historic districts, one individual building, and one archeological site within the National River have been placed on the National Register of Historic Places and several other areas are considered eligible. The river is valued for being free-flowing and relatively unpolluted, and for having both swift-running and placid stretches. Canoeing is a primary recreational activity on the river, with opportunities for both experienced and novice canoeists. Hiking, hunting, and fishing are also popular.

The National River encompasses 149 square miles (95,730 acres) and includes 135 miles of the 150-mile-long Buffalo River from the Boston Mountains to the White River. The headwaters are within the Ozark National Forest and were recently designated as part of the National Wild and Scenic Rivers System. Overall, the Buffalo River watershed is approximately 22 miles by 70 miles, and a total of 1,338 square miles in area, 11% of which lies within National Park Service administration and 29% of which in other federal or state ownership. Thus, the majority of the watershed, about 60%, is in private ownership. The area is characterized by river bluffs, some as high as 440 feet, as well as caves, cliffs, sinkholes, waterfalls, and springs. It is biologically diverse and is particularly rich in plant and fish species.

1.4 FIRE MANAGEMENT OBJECTIVES

NPS Wildland Fire Management Guidelines (DO-18) require that all parks with vegetation capable of sustaining fire develop a wildland fire management plan that will meet the specific resource management objectives for that park and to ensure that firefighter and public safety are not compromised. These guidelines identify fire as the most aggressive natural resource management tool employed by the National Park Service. The guidelines further state that all wildland fires are classified as either wildfires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and contribute to a park's resource management objectives. Human-caused wildfires are unplanned events and may not be used to achieve resource management objectives.

Wildland Fire is any non-structure fires, other than prescribed fires, that occurs in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Prescribed Fires are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific objectives.

Wildland Fire Use is the management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined

DO-18 identifies three paramount considerations for each park's fire management program. They are:

- protect human life and property both within and adjacent to park areas;
- perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and

- protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities

The overall goals of the proposed Buffalo National River Fire Management Plan are the following:

1. Preparedness and Suppression
   a. Prevent all unplanned human-caused fires.
   b. Protect the visiting public by providing information and implementing use restrictions or closing BNR as needed.
   c. Suppress all wildland fires in a manner consistent with protecting park resources including archeological, historic, landscape vistas, vegetative, wildlife, and infrastructure.

2. Hazard Fuels Management
   a. Reduce the potential for large wildland fires which could adversely affect BNR resources.
   b. Create natural firebreaks that would aid suppression actions.
   c. Use mechanical means to reduce fuels in locations where prescribed burning would adversely affect BNR values at risk.
   d. Apply prescribed fire to maintain landscape vista and maintain reduced fuel loads.
   e. Use appropriate methods of fuel management to reduce risk of fires in wildland-urban interface areas on the boundary.

3. Vegetation Management
   a. Restore and maintain forest community to historic appearance using fire and/or thinning as appropriate.
   b. Encourage growth of native forest understory species.
   c. Control exotic plant species.
   d. Control or mitigate insect and disease attacks by providing a healthy diversity of forest age classes.

4. Public Use/Interpretation
   a. Increase public awareness of the role of fire in natural processes through interpretation.
   b. Protect the visiting public and provide services traditionally found at BNR.

The following objectives from the 1982 Resource Management Plan relate directly to fire management.

1. Wildfires may cause damage to delicate ecosystems, degrade the scenic value of natural areas and destroy property. Conversely fire can also be used as a valuable resource management tool to improve wildlife habitat, maintain open areas and prevent forest fuel build-up. Very few lightning or natural caused fires have been recorded for the Buffalo National River region. However, the Ozarks have a long history of man-caused fires dating back to the Indian habitation.

Here fire has been used as a tool for field and forest management and as a weapon against one's enemies.

2. All wildfires will be suppressed.

3. A minimum program of prescribed burns would be initiated to evaluate fire as a tool to maintain some of the open fields, cedar glades and pine groves. These prescribed burns will be conducted to gather vital research information that will be used to establish the prescription necessary to accomplish the objectives of using fire as a management tool.

1.5 SCOPING ISSUES AND IMPACT TOPICS

On November 27, 2001, a scoping news release describing the Proposed Action was sent to a mailing list of approximately 40 individuals and organizations (see Appendix D). Addressees were requested to respond in writing by December 28, 2001 with any concerns they had or issues they wished to see addressed in this Environmental Assessment.

A total of eight letters were received during scoping: one from the U.S. Fish and Wildlife Service (USFWS), four from the Arkansas Game and Fish Commission, one from the Department of Arkansas Heritage, one from The Nature Conservancy, and one from a private individual. Copies of these letters are presented in Appendix D.

1.5.1 *Important Issues*

The following concerns and issues were raised by external stakeholders in the scoping process:

- The upland oak-history forest is dependent on prescribed fire to sustain health and vigor as well as regenerate the next forest.
- Due to long interruption of fire history, prescribed burning alone will not restore the more open woodlands of the past; chemical and mechanical means may also be necessary to achieve this goal.
- Prescribed fire should be used for management and improvement of habitat for threatened and endangered species.
- Fire suppression is necessary for protection of certain threatened and endangered species.
- Smoke management is a concern for certain T & E species, in particular bats in caves.
- Non-native species of grasses should not be perpetuated by the FMP.

These issues are addressed in one or more of the impact topics included in this EA.

1.5.2 *Other Issues Considered but not Evaluated in this Environmental Assessment*

There were no issues raised and considered by the study team that are not evaluated in the EA.

1.5.3 *Impact Topics Evaluated in this Environmental Assessment*

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this EA:

Geology and Soils: BNR contains valuable geologic resources and landforms, such as the bluffs and cliffs overlooking the Buffalo River, caves, natural arches, gypsum formations, and a 200-foot waterfall (Hemmed-in-Hollow). Intense fires, hazard fuel reduction, and suppression activities can adversely impact soils; therefore, impacts to soils are analyzed in this EA.

Water Resources: NPS policies require protection of water resources consistent with the Federal Clean Water Act. Buffalo National River and its tributaries constitute an outstanding water resource. Wildland fires, prescribed fires and fire suppression efforts can adversely impact water quality and quantity (flows), therefore, impacts to water resources are analyzed in this EA.

Floodplains and Wetlands: Presidential Executive Orders mandate floodplain management and protection of wetlands. The floodplain of the Buffalo River runs the length of BNR. As a general rule, wetlands support considerable biodiversity, but they are not particularly abundant at BNR, except along the river itself (considered under water resources above). Fires and to a lesser extent fire suppression activities can potentially influence floodplains and wetlands by increasing runoff, discharge rates, and water quality, and therefore impacts to floodplains are analyzed in this EA.

Vegetation: The park is largely forested but also contains a number of clearings. Since fire management activities would include fuels reduction, prescribed fire and the restoration of natural fire regimes, all of which affect vegetation, these impacts are analyzed in this EA.

Wildlife: There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates that could be impacted directly or indirectly by prescribed and wildland fires. Therefore, impacts to wildlife are evaluated in this EA.

Threatened and Endangered Species: The Federal Endangered Species Act of 1973 prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. In addition, the State of Arkansas maintains its own list of imperiled or rare species. There are a number of threatened and endangered species that reside within BNR that could conceivably be directly impacted by prescribed and wildland fires, by fire suppression, as well as indirectly impacted by post-fire habitat changes and habitat

changes from fire exclusion. Therefore, this impact topic is retained for further analysis in this EA.

Air Quality: The Federal 1963 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. Moreover, Buffalo National River is designated as a Class II area. While BNR generally enjoys good air quality, and is in attainment with the National Ambient Air Quality Standards on all parameters, it does not have pristine air quality. All types of fires generate smoke and particulate matter, which can impact air quality within BNR and the surrounding region. In light of these considerations, air quality impacts are analyzed in this EA.

Visitor Use and Experience: The 1916 NPS Organic Act directs the Service to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks "in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Fire management activities can result in the temporary closure of certain areas and/or result in visual impacts that may affect the visitor use and experience of BNR. Therefore, the potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

Human Health and Safety: Fires can be extremely hazardous, even life-threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority; all FMP's must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966 provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Buffalo National River contains nearly 500 identified archeological sites, many historic structures and several historic districts. These cultural resources can potentially be affected both by fire itself and fire suppression activities, thus potential impacts to cultural resources are addressed in this EA.

Park Operations: Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, campgrounds, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and more indirectly from smoke and the diversion of personnel to firefighting. Fires have caused closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on BNR operations will be considered in this EA.

Wilderness: The 1964 Wilderness Act states that wilderness, "in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." This statute established a National Wilderness Preservation System; designated areas in that system are to be left unimpaired for future use and enjoyment. Three separate units of

officially-designated Wilderness encompass 36,000 acres (more than a third) of Buffalo National River. Since wildland and prescribed fires and fire suppression can all affect wilderness values, the impact of the proposed FMP alternatives on wilderness is addressed in this EA.

1.5.4 *Impact Topics Considered but not Evaluated in this Environmental Assessment*

NEPA and the Council on Environmental Quality (CEQ) Regulations direct agencies to "avoid useless bulk…and concentrate effort and attention on important issues" (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been deemed to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

Noise: Noise is defined as unwanted sound. Fuels reduction, prescribed burns and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws, trucks, helicopters, and airplanes. Each of these devices, in particular helicopters and chain saws at close range, are quite loud (in excess of 100 decibels). The use of machines, such as chainsaws, would be infrequent and not pervasive enough to substantially interfere with human activities in the area or with wildlife behavior. Nor will such infrequent bursts of noise chronically impair the solitude and tranquility associated with BNR. Another factor for the dismissal of noise from an in-depth analysis is the general absence of nearby "noise-sensitive receptors" (e.g. schools, hospitals, nursing homes, churches) in the immediate area. Therefore, this impact topic is eliminated from further analysis in this EA.

Waste Management: None of the FMP alternatives would generate noteworthy quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

Transportation: None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around BNR. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from heavy smoke emanating from wildland fires or prescribed burns. Over the long term, such closures would be very infrequent and would not significantly impinge on local transportation or traffic. Therefore, this topic is dismissed from any further analysis.

Utilities: Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. Other proposed actions may exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed to meet the increased demand. None of the FMP

alternatives will cause any of these effects to any extent, and therefore utilities are eliminated from any additional analysis.

Land Use: Buffalo National River is largely surrounded by agrarian land uses typical of the area, with a somewhat greater emphasis on recreation than in other rural areas of the Ozarks. Fire management activities would not substantially affect land uses within BNR or in adjacent areas; therefore land use is not included for further analysis in this EA.

Socioeconomics: NEPA requires an analysis of impacts to the "human environment" which includes economic, social and demographic elements in the affected area. Fire management activities may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect neighboring communities' overall populations, incomes and employment bases. Therefore, this impact topic is not included for further analysis in this EA.

Environmental Justice / Protection of Children: Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. None of the alternatives would result in disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's Environmental Justice Guidance, and therefore this topic is not further addressed in this EA. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. Since none of the fire management alternatives involves disproportionate risks to the well-being of children, this topic is excluded from further analysis.

Ecologically Critical Areas: The Council on Environmental Quality regulations require consideration of the severity of impact on unique characteristics of the geographic area such as proximity to ecologically critical areas (e.g. biosphere reserve, world heritage site). No ecologically critical areas have been identified within or adjacent to BNR, and this impact topic has been dismissed from further evaluation.

Prime and Unique Agricultural Lands: Prime farmland has the best combination of physical and chemical characteristics for sustainable production of food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land be available for farming uses. Most lands within BNR are not available for farming and, therefore, do not meet these criteria. This impact topic is not evaluated further in this EA.

Indian Trust Resources: Indian trust assets are owned by Native Americans but held in trust by the United States. According to National Park Service personnel, Indian trust assets do not occur within BNR and, therefore, are not evaluated further in this EA.

Resource Conservation, Including Energy, and Pollution Prevention: The National Park Service's *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention on BNR and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1 Impact Topics for Buffalo National River Fire Management Plan Environmental Assessment

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Geology and Soils	Retained	NPS *Management Policies 2001*
Water Resources	Retained	Clean Water Act; Executive Order 12088; NPS *Management Policies*
Floodplains and Wetlands	Retained	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS *Management Policies*
Vegetation	Retained	NPS *Management Policies*
Wildlife	Retained	NPS *Management Policies*
Threatened and Endangered Species and their Habitats	Retained	Endangered Species Act; NPS *Management Policies*
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments (CAAA) of 1990; NPS *Management Policies*
Visitor Use and Experience	Retained	NPS *Management Policies*
Human Health & Safety	Retained	NPS *Management Policies*
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS *Management Policies*
Park Operations	Retained	NPS *Management Policies*
Wilderness	Retained	The Wilderness Act; Director's Order #41; NPS *Management Policies*
Noise	Dismissed	NPS *Management Policies*
Waste Management	Dismissed	NPS *Management Policies*
Transportation	Dismissed	NPS *Management Policies*
Utilities	Dismissed	NPS *Management Policies*
Land Use	Dismissed	NPS *Management Policies*
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; NPS *Management Policies*
Environmental Justice	Dismissed	Executive Order 12898
Ecologically Critical Areas	Dismissed	Wild and Scenic Rivers Act; 36 CFR 62 criteria for national natural landmarks; NPS *Management Policies*

Prime and Unique Agricultural Lands	Dismissed	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; NPS *Guiding Principles of Sustainable Design*; NPS *Management Policies*

Chapter 2 - Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team (IDT).

2.1 Alternatives Considered But Not Analyzed Further in This EA

2.1.1 *Revision of the 1988 Fire Management Plan to emphasize Wildland Fire Use and exclude Prescribed Fire throughout the Park*

Wildland Fire Use involves the management of fires ignited by natural means (usually lightning) that are permitted to burn under specific environmental conditions for natural resource benefits. This alternative would establish one Fire Management Unit (FMU) that encompasses the entire park (in place of the four FMU's that exist now) and depend on Wildland Fire Use throughout BNR instead of prescribed burns as a means of controlling hazard fuels and achieving vegetation and resource objectives.

This alternative was considered but not analyzed further in this EA because of its inherent risks and impracticability at Buffalo National River. The configuration of BNR – long, winding along the river course, and relatively narrow in many places – is such that fire containment within park boundaries and away from structures and developments requiring protection could not be guaranteed. Moreover, valuable cultural resources dispersed throughout BNR could be put at risk. Finally, since only about 2% of the BNR's fires are from natural ignition, the opportunities for WFU at BNR are limited. Buffalo National River's vegetation management objectives could probably not be achieved under this alternative. In all likelihood, due to the lack of prescribed fire, this alternative would allow for excessive fuel accumulation over a period of years, followed by a catastrophic, stand-replacement fire that might overwhelm suppression efforts.

In conclusion, BNR staff concluded that the potential risks to human health and safety, cultural resources, and improved property under this alternative, as well as the likely inability to meet vegetation management objectives, outweigh any possible resource benefits that would be obtained from emphasizing wildland fire use and excluding prescribed fires.

2.1.2 *Mechanical Fuel Treatments as a Fire Surrogate*

Under this alternative, hazardous fuel accumulations would be removed or manipulated by mechanical means to the extent practicable. Fuels would be burned in place or removed to another on-site location away from public views. This alternative was rejected because it would be cost-

prohibitive as the sole means of achieving hazardous fuels reduction for the entire park, and the absence of prescribed fire would not meet resource objectives of BNR to manage the forests as close to the natural fire regime as possible.

2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

2.2.1 *Alternative 1 (No Action Alternative) - Implement the 1988 Fire Management Plan*

This alternative meets the purpose and need by continuing the fire program according to the Fire Management Plan approved in 1988; however it would not be updated to reflect current fire policy guidance. The No Action Alternative would include the suppression of human-caused wildland fires, provide for prescribed fires, and allow for Wildland Fire Use for resource benefits in some places under certain conditions and restrictions. It should be noted that while Wildland Fire Use has been permitted at BNR under the 1988 FMP, it has not been utilized to this point.

Buffalo National River includes four Fire Management Units (FMU's). An FMU is any land management area characterized by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that distinguish it from management characteristics of an adjacent unit. These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Unit I is wilderness, totaling 36,000 acres. It consists of three sub-units: The Upper Buffalo Wilderness, the Ponca Wilderness, and the Lower Buffalo Wilderness; in other words, the three BNR wilderness areas as designated by Congress. The management objective of this unit is to allow natural processes to control, to the greatest extent possible, the wilderness ecosystems. Fire caused by a lightning strike is recognized as a natural force within the environment. Lightning-caused fires will be allowed to burn as long as they do not exceed certain constraints.

Prescriptions will be developed for the implementation and management of Wildland Fire Use and prescribed fire within the wilderness unit. Prescribed fires may be used to assist in the elimination of exotics; they may also be used to reduce excess fuel loadings only if studies show that abnormally high accumulations do exist because of past suppression actions. In addition, prescribed fire may be used to enhance and maintain unique plant communities as well as enhancing and maintaining endangered species habitat.

Unit II consists of agriculture and open fields. It includes all agricultural lands under special use permit, use & occupancy and scenic easement reservations, and fields within BNR identified by the Open Fields Management Plan. The management objectives in this unit are to use prescribed fire to maintain the vegetation in early successional stages, to provide scenic quality and wildlife habitat as well as to encourage native species and discourage exotic species. Prescriptions will be developed for each scenic easement and use & occupancy tract, which will incorporate the special reservation stipulations concerning the use of prescribed fire. Prescribed fires may be used:

1. to assist in the elimination of exotics and control of noxious or weedy species;
2. to maintain BNR's scenic diversity by burning agricultural/open fields;

3. to maintain the already-identified emergency rescue helipads;
4. to conduct research burns to further knowledge on the effects of fire upon BNR ecosystems;
5. by scenic easement and use & occupancy reservation holders only after securing permission from the BNR superintendent and meeting state and local burning requirements. Burning uses might include debris, open fields management, or vegetation management in accordance with BNR objectives.

Unit III is development. It includes all structures located within BNR, including residential homes, historic buildings, cabins, maintenance facilities, barns, sheds, campgrounds, picnic areas, information stations, radio towers, discovery sites, bulletin boards, signs, utility poles and delineators. In addition, it includes those lands adjacent to agricultural or residential lands outside the BNR boundary. Management objectives for this unit are to protect all park visitors and structures from fire and to fireproof private lands and persons from fires originating within BNR jurisdiction.

Protection zones will be established around all structures having human occupation and visitation. All lightning fires will be suppressed within the development zone. Prescribed fires may be used:

1. to reduce fuel loadings within protection zones and around identified structures to protect them from wildfires;
2. to assist in the elimination of exotics and control of noxious or weedy species;
3. to maintain scenic diversity within plant associations;
4. to burn debris acquired through normal maintenance operations and from periodic flooding;
5. to perpetuate the historic scene or setting;
6. to conduct research burns to further knowledge of the effects of fire upon BNR ecosystems;
7. to build firebreaks along the boundary to fireproof private lands outside the park.

Unit IV is natural. It includes all other lands not contained in one of the prior FMU's. This unit is broken down into three sub-units, based upon vegetative associations. They are Floodplain / Beech, Mixed Hardwood / Oak-Hickory, and Oak-Pine / Cedar-Glade. Prescribed fire will be used as a tool to maintain the park's unique scenic qualities as well as to benefit BNR's fire-dependent species. Prescriptions for each of the vegetative associations will be developed. Prescribed fire may be used:

1. to assist in the elimination of exotics and control of noxious or weedy species;
2. to maintain BNR's scenic qualities; by burning the old fields within the Floodplain / Beech sub-unit; by stimulating the regeneration of oaks within the Mixed Hardwood / Oak-Hickory sub-unit; and by stimulating the regeneration of pine and glades within the Oak-Pine / Cedar-Glade sub-unit.

3. to maintain BNR's natural vegetative associations;
4. to conduct research burns to further knowledge on the effects of fire upon BNR ecosystems;
5. enhance and maintain habitat for wildlife species.

2.2.2 Alternative 2 (Preferred Alternative) - *Revise 1988 Fire Management Plan to Reflect Current Fire Policy Guidance*

Under this alternative, the 1988 Fire Management Plan would be revised to reflect current Federal fire policy guidance. Overall FMP goals and objectives, Fire Management Units and their management objectives, activities and prescriptions would remain the same as those described under the No Action Alternative.

Since the completion of BNR's previous version of its Fire Management Plan in 1988, national fire policy guidance has changed. The National Fire Plan of 2000 embodied the philosophical changes in fire policy and outlined four major goals. These included:

- Improve Prevention and Suppression
- Reduce Hazardous Fuels
- Restore Fire Adapted Ecosystems
- Promote Community Assistance

The National Fire Plan placed emphasis on the use of prescribed fire, mechanical thinning and Wildland Fire Use as tools that could be used to meet these goals. However, for the reasons listed in section 2.1.1 of this EA, Wildland Fire Use is not considered an element of this alternative. Congress embraced this new fire policy direction through its appropriations to fund projects nationwide that would help meet the national fire plan. In particular, Congress emphasized the need to protect the wildland urban interface by reducing hazardous fuel levels. A final difference under the new National Fire Plan involved administrative changes that allowed certain fire management activities of federal agencies to be funded from "emergency funds."

Besides the philosophical changes in fire policy, there have also been terminology changes since the memorial's Fire Management Plan from 1993. The key terminology changes were the following:

- "Prescribed natural fire" would be known as "Wildland Fire Use";
- "Management-ignited prescribed fires" would be known as "prescribed fire";
- The use of the terms "contain, control, and confine" would no longer be used as descriptive strategies for wildland fire suppression in fire management plans. Formerly, each term was defined in a fire management plan with an accompanying description of the fire management strategy associated with it. Under new policy guidance, the terms would only be used during fire management activities to describe firefighter's progress in suppressing wildland fires.

2.2.3 Alternative 3 – *Suppression of Wildland Fires and No Prescribed Fire*

Under this alternative, the 1988 FMP would be updated to reflect current fire policy guidance and would state that all wildland fires (human-caused and naturally-ignited) would be declared wildfires and suppressed. In addition, prescribed fire would not be permitted on BNR for resource benefits or for slash pile burning. Mechanical thinning treatments would be similar to those described in the No Action Alternative. Priority areas to be treated would include those adjacent to structures, developed sites, historic/cultural resources, roadways, and boundary areas for protection of private resources located outside of BNR jurisdiction.

2.2.4 *Environmentally Preferred Alternative*

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects. That alternative is the alternative that will promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

2) ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;

4) preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;

5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and

6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In essence, the environmentally preferred alternative would be the one(s) that "causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (DOI, 2001a).

In this case, the Proposed Action is the environmentally preferred alternative for Buffalo National River since it meets goals 1, 2, 3, and 4, and partially achieves goal 6 (by enhancing the quality of renewable resources) described above. Under this alternative, fire management activities would reduce hazardous fuel loadings on BNR, help to mimic natural ecological processes, and help protect BNR resources and adjacent lands from the threat of wildland fires. Finally, the alternative best protects and helps preserve the historic, cultural, and natural resources in BNR for current and future generations.

2.3 IMPACT DEFINITIONS

Table 2-1 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, compliance with existing Buffalo National River planning documents.

Table 2-1 Impact Definitions

	"Minor" Impact	"Major" or "Significant" Impact
Key Resources		
Geology and Soils	Minor damage to or loss of the litter/humus layers that causes minor localized increases in soil loss from erosion; fire severe enough to cause minor harm to soil community; minor, temporary surface sterilization of soils that does not cause long term loss of soil productivity that would alter or destroy vegetation community; short-term and localized compaction of soils that does not prohibit re-vegetation	Damage to or loss of the litter/ humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to damage soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy a portion of the vegetation community; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation
Water Resources	Minor damage to or loss of the litter/humus layers that increases sedimentation on no more than 0.1% of a subwatershed; localized and indirect riparian impact that does not substantively increase stream temperatures or affect stream habitats; negligible alteration of hydrology of Buffalo River	Damage to or loss of the litter/ humus layers that increases sedimentation on greater than 0.1% of a subwatershed; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; alteration of hydrology of Buffalo River
Vegetation	Short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; thinning of	Violation of the Endangered Species Act of 1973; significant increase in exotic species; removal of numerous large diameter or old growth trees greater than 80cm at breast height

	small diameter understory trees; some increase in exotic species; occasional death of a canopy tree	
Wildlife	Temporary displacement of a few localized individuals or groups of animals; mortality of individuals of species not afforded special protection by state and/or federal law	Adverse impacts (taking, permanent displacement, loss of critical habitat) to Threatened, Endangered, or Sensitive species or their protected habitats (federal and state listed); mortality of species sufficient to jeopardize the resident population
Threatened and Endangered Species and their Habitats	Temporary displacement of one or more species of plant and/or animal listed by State or Federal govern-ment as threatened, endangered, or species of Special Concern; permanent loss of quantity of preferred habitat of listed species sufficient to result in up to 10% decline in population of one or more listed species on the unit	Permanent adverse effect on BNR population (greater than 10% reduction) of one or more Federal threatened or endangered species, whether from loss of habitat, or from any other reason directly attributable to the Proposed Action
Air Quality	Minimal to negligible air emissions and temporary smoke accumulation; temporary and limited smoke exposure to sensitive resources	Violation of state and federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors
Visitor Use & Experience	Temporary displacement of recreationists or closure of trails, and recreation areas during off-peak recreation use; temporary or short-term alteration of the vista, or temporary presence of equipment/structures in localized area; smoke accumulation during off-peak recreation use	Permanent closure of trails and recreation areas; conflict with peak recreation use; long-term change in scenic integrity of the vista; substantive smoke accumulation during peak recreation use
Human Health & Safety	Minor injuries to any worker (e.g. minor cuts or bruises); limited exposure to hazardous compounds or smoke	Serious injury to any worker or member of the public; exposure to hazardous compounds or smoke

	particulates at concentrations below health-based levels	particulates at concentrations above health-based levels.
Cultural Resources	No adverse effects to properties listed on or potentially eligible for listing on the National Register, to ethnographic values, or to museum objects.	Temporary or long-term adverse impacts to properties listed on or potentially eligible for listing on the National Register, to ethnographic values, or to museum objects.
Park Operations	Temporary suspension of non-critical BNR operations; negligible impact to BNR buildings and structures	Prolonged suspension of all BNR operations; adverse impacts to BNR buildings and structures
Wilderness	Temporary intrusion of artificial noise, sights, smells or substances into a designated Wilderness area; temporary intervention in natural processes such as succession	Permanent intrusion of artificial noise, sights, smells or substances into a designated Wilderness Area; long-term or permanent intervention in natural processes like succession

2.4 MITIGATION MEASURES AND MONITORING

The National Fire Effects monitoring program, based on the Fire Monitoring Handbook (NPS, 2001b) , sets forth standards for National Parks conducting prescribed fire operations. Monitoring consists of pre-burn vegetation and fuel inventory, fire behavior observations during prescribed fire, and post-burn vegetation and fuel inventories. Monitoring types, based on dominant vegetation communities, are developed for each park by resource managers and fire effects monitoring personnel.

Ozark National Scenic Rivers Fire Effects Crew would install permanent vegetation plots prior to prescribed fires using protocols modified from the Fire Monitoring Handbook. These plots will be re-measured immediately following the fires, and at regularly determined intervals to verify that prescribed fire objectives are being met, that desired conditions are being reached, and that unwanted fire effects are not occurring.

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire management activities. Except those pertaining specifically to prescribed fire, which do not apply to Alternative 3, mitigation measures are otherwise common to all alternatives.

2.4.1 *Fire Management Activities*

- Whenever consistent with safe, effective suppression techniques, the use of natural barriers would be used as extensively as possible;
- All suppression guidelines will follow MIST guidelines;

- Fire retardant agents must be on an approved list for use by the Forest Service and Bureau of Land Management;
- Earth-moving equipment such as tractors, graders, bulldozers or other tracked vehicles would generally not be used for fire suppression. The Superintendent can authorize the use of heavy equipment in extreme circumstances in the face of loss of human life and/or property);
- When handline construction is required, construction standards would be issued requiring the handlines to be built with minimum impact. No handlines exposing mineral soil would be allowed through cultural sites, and all handlines would be rehabilitated. Erosion control methods would be used on slopes exceeding 10% where handline construction took place;
- All sites where improvements are made or obstructions removed would be rehabilitated to pre-fire conditions, to the extent practicable.

2.4.2 *Soil Resources*

Minimum Impact Suppression Tactics (MIST) will be used in all fire suppression activity. MIST relevant to protecting soils include the following:

- Cold trail the fire-edge when practical.
- Wetlines, or environmental lines, will be used wherever possible in lieu of handline construction if water and pumps are available. Waterbars will be constructed on handlines on steep slopes.
- Utilize soaker hose or foggers in mop-up. Avoid "boring" and hydraulic action on shallow soils.
- Fire lines will be kept to the minimum width necessary to allow backfiring or safe blackline to be created. Utilize natural barriers wherever possible to avoid "tunnel effect."
- If a mineral soil line is needed, utilize fire line explosives whenever possible instead of a bulldozer.
- Except for spot maintenance to remove obstructions, no improvements would be made to intermittent/perennial waterways, trails, or clearings in forested areas.
- Fire lines would be located outside of highly erosive areas, steep slopes, and other sensitive areas. Following fire suppression activities, fire lines would be re-contoured, water barred, and possibly seeded (with native plant species).

2.4.3 *Water Resources*

- Stream crossings would be limited to set and existing locations.
- Log jams/debris would be left in streams to protect fish and aquatic insect habitat.

The following special restrictions apply to aerially-applied retardant and different types of foam suppressant use:

Retardant – Aerial retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.

Foam (aerial delivery) – Aerial delivery of foam requires Park Superintendent approval on a case-by-case basis. When approved, the following guidelines apply:

- Foam concentrate will only be injected into the holding tank after the water pick-up operation has been completed.
- Drops from Single Engine Air Tankers (SEATs), T2 & T3 helicopters – no drops within 200 feet of open water.
- Drops from heavy air tanker or heavy helicopter – no drops within 400 feet of open water.

Foam (ground delivery with motorized pumps):

- No application within 25 feet of open water when using small pumps.
- No application within 50 feet of open water when using Mk III or equivalent pumps.
- All foam concentrate used for injection will be located in impermeable containment basins, i.e. visqueen (plastic sheet) spread over rocks or logs to form a catch basin.

Foam (ground delivery with backpack pumps):

- No application within 10 feet of open water.
- All backpack pumps will be filled a minimum of 10 feet from open water. A separate, uncontaminated container must be used to transport water from source to backpack pump. This container must be kept uncontaminated by concentrate.

2.4.4 *Threatened and Endangered Species*

The NPS will consult and coordinate with the USFWS and the Arkansas Game & Fish Commission to ensure that prescribed fire and other fire activities will minimize detrimental effects and maximize benefits to all known listed species in BNR.

2.4.5 AIR QUALITY

SMOKE-SENSITIVE TARGETS

Management needs to recognize areas where smoke problems are likely and take steps to notify visitors and/or mitigate the smoke intrusion. At BNR, the notification process will be part of the public information and interpretation program outlined in Chapters XIV and XV of the FMP. Information on the objectives of the BNR fire management program will be explained to visitors and residents exposed to smoke discomfort from any fires.

Smoke management guidelines produced by the U.S. Forest Service recommend identifying all sensitive areas downwind of and within 10 miles for backing fires, 20 miles of head fires or large burns (over 250 acres), or 30 miles for logging debris or slash fires.

OTHER MITIGATION STRATEGIES

a. Planned prescribed fires and Wildland Fire Use fires – Fires to improve resource values will have a smoke dispersion component in the prescription. If smoke creates a prolonged hazard or significant nuisance, appropriate actions will be taken to mitigate the condition causing the problem or the fire will be suppressed.

b. Suppression – Suppress or mop up smoldering fuels when they are likely to generate smoke management "problems."

c. Ignition – Ignite smoldering fuels to get them to burn with an active flame, which generates less than half the emissions than smoldering combustion. Flaming combustion also generates convection columns, which raise smoke above ground level.

d. Types of Fires – Use backing fires when possible.

e. Dispersion – Recognize poor dispersion conditions that will last several days, such as the predicted passage of a slow-moving warm front; a lingering high pressure system with stable atmosphere; or high humidity conditions, and adjust burning strategies as necessary.

f. Residual Smoke – When a fire has burned for an extended period of time and generated a lot of residual smoke, the NPS will consider suppressing all new starts to minimize additional smoke production.

g. Firefighter Safety – During high smoke production phases of a fire suppression operation, crews will be rotated out of high smoke areas.

h. Sensitive Areas – Planned prescribed fire ignitions in sensitive areas will be done either when visitation is low, or the Superintendent will restrict entry to areas potentially impacted by smoke.

AIR QUALITY AND SMOKE MONITORING

The Incident Commander (IC) or Prescribed Burn Boss (RxB1/2) is responsible for monitoring weather and smoke dispersion conditions and forecasts, and taking appropriate action.

No special quantitative smoke or emissions monitoring is possible beyond the normal air quality monitoring instruments in BNR. Unfortunately, these do not provide useful real-time data for fire management purposes. Unusual or adverse smoke conditions will be documented by the Incident Commander or prescribed burn boss in the fire log (and with photographs when possible). District Rangers will be responsible for alerting the IC or RxB1/2 of impending or actual smoke problems in their districts.

In extraordinary circumstances, portable air quality monitoring equipment may be available from the NPS Air Quality Division.

2.4.6 *Visitor Experience and Use*

- Prescribed fires would not be ignited in close proximity to park structures during periods of peak visitation unless the areas were closed to the public;

An excellent opportunity is available for fire information dissemination at each visitor contact area. To further public information and education, the following guidelines will be followed:

- Timely and accurate information will be provided to the media and BNR visitors regarding the status of fire actions and suppression efforts.
- Informational handouts explaining the fire management program will be prepared and updated as necessary. During periods when management fires are burning, these handouts will be distributed to BNR visitors and general public.
- The prescribed burn program will be discussed in informal contacts with all unit personnel, neighbors and visitors.
- Adjacent landowners will be notified when fire, particularly wildland fire, is a threat to off-River residential areas.

2.4.7 *Human Health and Safety*

In order to make Service employees and the general public aware of such hazards, the following mitigation measures will be considered:

- General public will be made aware of wildland fires and prescribed burns through press releases and general interpretive presentations.
- The general public will not be allowed access to any areas affected by fire.
- Safety briefings will be conducted for NPS personnel prior to any participation in wildland suppression or prescribed burns.
- Appropriate regulatory and/or enforcement agencies will be notified prior to any prescribed burns to assist in safely managing pedestrian, equestrian or vehicular traffic. Warning signs will be posted along roads and trails as necessary.
- All firefighters will be red card qualified (federal employees) or qualified under their agency or department standards (VFD or non-federal employees) to perform the duties to which they are assigned.
- All fire personnel will be reminded of the "18 situations that Shout Watch Out" and will be expected to comply with the "10 Standard Fire Orders".

2.4.8 *Cultural Resources*

Archeological and historic resources found within BNR are irreplaceable. Therefore these sites and structures must receive special attention. Guidelines from NPS-28 and other legal mandates will be followed to protect these resources from fire. Personnel taking part in suppression as

well as prescribed burns will be briefed on the potential for disturbance of such resources. Any and all control actions undertaken will minimize the impact on such resources; wet line, foam and leaf blowers are the preferred minimum impact suppression techniques. Prior to prescribed burn operations, BNR will consult with local tribes to examine possible concerns related to ethnographic resources, and the State Historic Preservation Office (SHPO) will be given opportunity to comment under National Historic Preservation Act (NHPA) Section 106 requirements. No construction of hand lines through mineral soil will occur in connection with prescribed fire.

1. General Measures for Protection and Mitigation

- Buildings, structures, ruins and sites (including fences and roads) need to be protected, depending on the situation, by:
  a) Pre-burn inventory of above-grade resources
  b) Hand cutting of fuel load, including perimeter clearings, which does not impact historic plantings or landscapes
  c) Wet or blown hand lines
  d) Forming of buildings
  e) Exclusion from prescribed burns
- Individual burn plans will identify the best methods.
- Post-burn assessments should evaluate the effect of individual burns on cultural resources.
- Post-burn assessments should identify should evaluate the effect of repetitive burns on cultural resources.
- Cultural resource personnel must be consulted during the preparation of burn plans in order to assess the effect on cultural resources in burn areas.
    - Resource maps showing archeological and historic site locations will be given to archeologists and fire bosses on the fire lines.
    - When cultural resources are threatened by a fire, archeologists will be present to help mitigate the impacts of fire suppression and rehabilitation on cultural resources.
    - Priority will be given to monitoring heavy equipment, especially bulldozers and graders, through all aspects of the suppression and rehabilitation efforts.
    - Archeologists serving on a fire as technical specialists must hold a current red card to perform specific advisory duties on the fire line.
    - Line archeologists will be equipped with appropriate standard firefighting safety equipment.
    - Special flagging will be used to identify archeological and historic sites.
    - A photographic record will be kept of all archeological materials uncovered during fire management and rehabilitation activities.
    - The Cultural Resource Management Specialist will coordinate all activities of line archeologists with fire bosses.

2. Archeological Sites – There are more than 488 identified archeological sites scattered throughout BNR. The heat generated from a particularly hot fire can cause the fracturing of

lithic materials lying on or close to the surface. To protect these sites, the following actions will be taken:

- The Prescribed Burn Boss (RxB1/2) or Incident Commander (IC), with assistance from the BNR Archeologist, will identify all sites that may be, or have been affected by active fire.
- For wildland fires – The degree of heat penetration into the soil is the primary concern. A fire moving with a high rate of spread and not burning down to the soil will have little effect on lithics. However, if the fire is slow moving and is consuming all fuel to the mineral soil, the fire will be suppressed if firefighter safety will not be compromised.
    - For prescribed fire – If the prescription calls for removal of more than 50% of the ground litter, the site will be excluded from the burn or wetline, foam or other techniques will be used to exclude fire from the site.
    - The RxB1/2 or IC will not use digging handtools to construct fire line within any known site boundaries.
    - If fire has already burned over a site, the RxB1/2 or IC will alert the BNR Archeologist or designee, who will examine the site for obvious lithics and possible impacts and submit a report for inclusion in the unit's main archeological file. The BNR Archeologist will also make a determination as to whether an archeological evaluation is warranted.
    - The protection of sites will be done in such a manner as to not permit public disclosure.

If Native American human remains and/or objects are found during fire operations, the site will be evaluated by staff or regional archeologists in accordance with Sec. 3, Native American Grave Protection Resource Act (NAGPRA).

3. Historic – Buffalo National River has several historic zones and many historic structures. Historic and potentially historic structures either on or are being evaluated for inclusion in the National Register of Historic Places and the List of Classified Structures (LCS). For those structure not yet formally listed on the LCS, the following guidelines will be followed:

- All structures will be protected from fire.
- Structures identified as having historic significance will be protected from all fires.
- Those structures not having historic significance will become discovery sites. These sites will be protected from all fires.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, important issues, and impact topics. Chapter 3 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
PROJECT NEED			
Reduces hazardous fuels	Yes, hazardous fuels reduction achieved and maintained over time. This alternative provides hazardous fuels reduction similar to that under the Proposed Action.	Yes, hazardous fuels reduction achieved and maintained over time. This alternative provides hazardous fuels reduction similar to that under the No Action Alternative.	Partial hazardous fuels reduction over time in buffer zones around developed and cultural sites, by use of mechanical thinning. This alternative provides much less hazardous fuels reduction than that provided under the No Action Alternative
Restoration of fire regime, plant and wildlife habitat diversity	Yes, a low-severity, high frequency fire regime favoring fire-adapted and fire-dependent plant and animal species would result. The degree to which this alternative restores a historic fire regime and contributes to plant and wildlife habitat diversity is similar to that achieved under the Proposed Action.	Yes, a low-severity, high frequency fire regime favoring fire-adapted and fire-dependent plant and animal species would result. The degree to which this alternative restores a historic fire regime and contributes to plant and wildlife habitat diversity is similar to that achieved under the No Action Alternative.	No, habitat and diversity would continue to decline in the absence of fire; noxious and non-native weedy species would spread. This alternative does **not** restore a historic fire regime and detracts from plant and wildlife habitat diversity.
Project Objectives			

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
Reduces the fire danger to the park and adjacent communities	Yes, reduced fire danger to the park and adjacent communities. This alternative provides fire danger reduction similar to that provided under the Proposed Action.	Yes, reduced fire danger to the park and adjacent communities. This alternative provides fire danger reduction similar to that provided under the No Action Alternative.	Yes, reduced fire danger to the park and adjacent communities. This alternative provides **less** fire danger reduction than the No Action and Proposed Action Alternatives.
Important Issues			
Potential escape of prescribed fire	This alternative allows for prescribed fire, however, potential for escape would be minimal in light of mitigation measures and adherence to guidelines and procedures for ignition of prescribed fire.	This alternative allows for prescribed fire, however, potential for escape would be minimal in light of mitigation measures and adherence to guidelines and procedures for ignition of prescribed fire.	No potential for escape of prescribed fire since there would be no prescribed fires.
Impact Topics			
Geology and Soils	Minor short-term soil erosion impacts resulting from thinning and prescribed fire activities; benefits to soil development and soil nutrification	Minor short-term soil erosion impacts resulting from thinning and prescribed fire activities; benefits to soil development and soil nutrification	Very minor short-term soil erosion and compaction impacts resulting from thinning activities; increased potential for high-severity fire in the future with adverse soil impacts
Water Resources	Minor impacts to surface water resources from erosion, sedimentation and turbidity	Minor impacts to surface water resources from erosion, sedimentation and turbidity	Very minor impacts to surface water resources from erosion, sedimentation and turbidity in

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
			most years; infrequent, high-severity fires will lead to moderate or major, short-term adverse impacts on water quality and increased flow rates during storm events
Floodplains and Wetlands	Minor impacts on flooding within Buffalo River floodplain and along tributaries; negligible impacts on wetlands	Minor impacts on flooding within Buffalo River floodplain and along tributaries; negligible impacts on wetlands	Very minor impacts on flooding within Buffalo River floodplain and along tributaries in most years; negligible impacts on wetlands. In years when high-severity wildfire strikes, flooding could be more severe as a result of vegetative cover loss and erosion over large areas
Vegetation	Plant habitat and diversity improved; historic forest composition and structure and fuel loadings begin to return; noxious weed species reduced	Plant habitat and diversity improved; historic forest composition and structure and fuel loadings begin to return; noxious weed species reduced	Plant habitat and diversity degraded as composition and structure shift toward unnatural abundance of shade-tolerant and fire-intolerant species; continued spread of noxious weeds; fuel loadings increase until large, intense fire consumes them; overall impairment of vegetation resources; overall significant adverse impact and impairment of native vegetation and natural

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
			plant communities in park
Wildlife	Thinning and prescribed fire activities would temporarily displace some wildlife species; individual mortality within some species likely; overall wildlife habitat quality improved in the long-term with restoration of historic fire regime	Thinning and prescribed fire activities would temporarily displace some wildlife species; individual mortality within some species likely; overall wildlife habitat quality improved in the long-term with restoration of historic fire regime	Wildlife benefits resulting from historic fire regime not realized; significant adverse impact and impairment of wildlife values and resources in the absence of prescribed fire and WFU
Threatened and Endangered Species	Thinning and prescribed fire activities would temporarily displace some wildlife species; individual mortality within some species likely, especially of sensitive plants which cannot escape flames; overall, however, improved habitat in the long-term with restoration of historic fire regime will benefit T & E species	Thinning and prescribed fire activities would temporarily displace some wildlife species; individual mortality within some species likely; no impact on T&E or Sensitive species; wildlife habitat improved in the long-term with restoration of historic fire regime	Benefits to T & E species resulting from historic fire regime and changes to habitat not realized; general habitat degradation as unnatural vegetation structure and species composition develops in absence of prescribed fire and WFU; probable significant adverse impact to T & E species
Air Quality	Minor and temporary effects on NAAQS and visibility resulting from prescribed fire and WFU; minor smoke impacts on sensitive receptors	Minor and temporary effects on NAAQS and visibility resulting from prescribed fire and WFU; minor smoke impacts on sensitive receptors	Suppression efforts reduce air quality impacts from wildfires in most years; however, higher fuel loads that accumulate over time will lead to more intense fires and smoke generation every few decades
Visitor Use and Experience (including	Minor and short-term impacts	Minor and short-term impacts during	Minor and short-term impacts

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
Park Operations)	during thinning, suppression and prescribed fire activities (e.g. trail or road closures, presence of work crews in the vista); no effect on park operations	thinning, suppression and prescribed fire activities (e.g. trail or road closures, presence of work crews in the vista); no effect on park operations	during thinning and suppression activities (e.g. trail closures or limited access to certain areas, presence of work crews in the vista); potential for impacts on park operations in the event of high-severity fire
Human Health & Safety	Human health and safety improved by reducing fire danger to the park; potential for injury from thinning activities; very minor exposure to smoke by workers and the public during prescribed fire	Human health and safety improved by reducing fire danger to the park and adjacent communities; potential for injury from thinning activities; very minor exposure to smoke by workers and the public during prescribed fire	Human health and safety improved marginally with reduction of hazardous fuels via thinning alone; increased fire danger to park and adjacent lands in the long-term with fuels buildup in the absence of prescribed fire
Cultural Resources	No impact or minor impact to known cultural resources likely; potential for impacts to un-recorded sites	No impact or minor impact to known cultural resources likely; potential for impacts to un-recorded sites	No impact or minor impact to known cultural resources; potential for impacts to un-recorded sites
Wilderness	Minor short-term impacts from occasional human presence and activities associated with prescribed fire and suppression within designated Wilderness Areas; long-term improvement in	Minor short-term impacts from occasional human presence and activities associated with prescribed fire and suppression within designated Wilderness Areas; long-term improvement in wilderness	Short-term minor impacts associated with prescribed fire avoided; some short-term impacts from suppression remain; however, long-term quality of wilderness resource is

Table 2-2 Comparison of Alternatives' Responses to Project Need, Objectives, Important Issues, and Impact Topics

	Alternative 1 - No Action Alternative	Alternative 2 – Preferred Alternative	Alternative 3 – Suppress Wildland Fires and No Prescribed fire
	wilderness character as habitat and wildlife diversity improve, and by allowing fire to regain its role as a natural force	character as habitat and wildlife diversity improve, and by allowing fire to regain its role as a natural force	degraded as a result of excluding fire as a natural force and consequent unnatural changes in habitat and wildlife; thus there is an overall significant adverse impact

Chapter 3 – Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided.

Unless otherwise noted, the information in this chapter comes from Buffalo National River's *Final Master Plan* (NPS, 1977), its Resource Management Plan (NPS, 1982), its 1988 Fire Management Plan (BUFF, 1988), its official map and guide (NPS, 1998), and the park's GIS database, maintained at park headquarters in Harrison, Arkansas.

> Buffalo National River, containing more than 95,000 acres, is located in north-central Arkansas within the heart of the Ozark Plateau. The BNR jurisdiction encompasses 132 miles of the free-flowing Buffalo River, which spans the four counties of Newton, Searcy, Marion, and Baxter.

Buffalo River itself drains a watershed containing 1,338 square miles. The forces of erosion have sculpted the Buffalo River landscape to its present day appearance. Flat-topped ridges are joined by hollows containing rocky slopes and bluffs, which descend to the alluvial floodplains of the Buffalo River.

Buffalo National River has hot summers and mild winters. Precipitation averages 48 inches per year, falling primarily from October to June. Recorded temperatures have varied from 114° F to –23° F, with an average annual temperature of 58° F. Thunderstorms, hail, occasional tornadoes and wet winter snowfall cause considerable damage from limb and bole breakage.

Fires from lightning strikes have presumably occurred for millennia, but little data exist to provide a clue as to their frequency and intensity prior to settlement times. As noted earlier, first Indians and later, European settlers used fire as a means of manipulating the natural environment to their advantage.

Written accounts strongly suggest the use of fire by Indians to burn off prairies. This was done to encourage the emergence of lush new grasses, relished by free-ranging elk and bison, and to drive wildlife towards hunters in ambush. With the advent of European settlement, fire played an increasing role in the development of the agrarian economy. Fire was used to clear land, renew pastures, encourage wildlife habitat and reduce tick and chigger populations.

3.1 GEOLOGY AND SOILS

3.1.1 *Affected Environment*

3.1.1.1 Geology

The Buffalo River's physiographic location is in the Interior Highlands Division of the Ozark

Plateaus Province, with headwaters in the Boston Mountains section and the remainder in the Burlington Escarpment or the Salem Plateaus section (BNR, 1982). The river begins at 2,400 feet above mean sea level and flows downward to elevations less than 400 feet before joining the White River. The river's geologic features include layered rocks and fossils; ancient peneplains and prominent escarpments; caves, arches and sinks; canyons and valleys. The channel is exceptionally stable, generally composed of gravel and boulder deposits overlying the solid rock floor. Frequently, the rock strata forms the channel floor. All formations are of sedimentary origin and consist mainly of limestone, dolomite, shale, sandstone, and chert.

Karst features are abundant at BUFF, due to the widespread nature of underlying limestone and dolomite within the National River, and over 300 caves and numerous springs and sinkholes have been identified.

3.1.1.2 Soils

Soils are comprised of sandy and silt loams in the more fertile floodplains of the valleys and of less productive cherty loams and clays on the steeper slopes and ridges. Thin soils that occur in most areas are easily eroded. Most soils are well drained.

3.1.2 *Environmental Consequences*

Soil impacts were qualitatively assessed using soil characteristics, literature review, and mitigation measures.

3.1.2.1 Alternative 1 – No Action

Proposed activities with the potential to impact soils include building fire lines, thinning, and prescribed fire.

Very minor and localized soil compaction would occur from thinning activities, and vehicle use would be restricted to existing roads. Fire line construction would result in some soil disturbance and could lead to increased erosion, especially in steeply sloped areas within the park. In light of the park's typical hand line construction methods, namely leaf rakes and council tools, there would not be significant impacts to soils except on slopes exceeding 60% with hand lines running straight up or downslope. To avoid these potential impacts, fire lines would be located outside of highly erosive areas, steep slopes, and other sensitive areas. Following fire suppression activities, fire lines would be re-contoured, water barred, and possibly seeded (with native plant species).

Prescribed fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrients for vegetation in the area. In addition to increasing nitrification of the soils, raising pH, and increasing minerals and salt concentrations in the soil, the ash and charcoal residue resulting from incomplete combustion aids in soil buildup and soil enrichment by being added as organic matter to the soil profile. The added material works in combination with dead and dying root systems to make the soil more porous, better able to retain

water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhizae, and roots (Vogl, 1979; Wright and Bailey, 1980).

If a prescribed fire exceeded a burn prescription and burned "hot," resulting in areas of high-burn severity, the organic layer of the soil could be consumed and soil layers could become water repellant. Fire management personnel would contain and/or suppress out-of-prescription fires, minimizing the potential for and effects of any high-burn severity prescribed fires. Wildland fires will generally burn hotter than prescribed fires, but the effects are very much dependent on soil moisture conditions.

3.1.2.2 Alternative 2 – Preferred Alternative

General soil impacts under Alternative 2 would be similar to those described under the No Action Alternative.

3.1.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

General soil impacts would be similar to those described under the No Action Alternative, except that the benefits accruing to soils from prescribed fire would not occur. Also, due to the occasional larger, more intense fires likely to occur under this alternative (from the fuels buildup that suppression results in over time), soils would be potentially more vulnerable to erosion as they become exposed during and after these larger wildfires when protective vegetative cover is burned off.

Conclusion

The implementation of any of the alternatives would not impair geologic and soil resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of BNR or opportunities for enjoyment of BNR, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents.

3.2 WATER RESOURCES

3.2.1 *Affected Environment*

3.2.1.1 Watershed

The Buffalo River drains an elongated basin, 22 by 70 miles, and covers 1,338 square miles. Flowing from the Boston Mountains on the west to the White River on the east, it follows a 153-mile winding course. Small tributaries enter at intervals. The geology and hydrology of the Buffalo River watershed is unique because of a combination of factors such as karst geomorphology, steep topography, shallow soils and highly integrated ground/surface water.

3.2.1.2 River

The Arkansas Department of Pollution Control and Ecology has designated the Buffalo River and Richland Creek (a tributary) as "Extraordinary National Resource Waters," providing the highest water quality standards and protection through a policy of non-degradation. The water quality of the Buffalo has remained relatively unpolluted due to the large amount of forested land, few point source pollution sources, and a relatively sparse population within the watershed. Water quality problems are related to high fecal coliform bacteria levels, sediment loading, and nutrient enrichment from a variety of animal operations, sewage treatment operations, inadequate rural septic systems, and runoff from bare ground. Following several short-term water quality studies in the 1970's and early 1980's, the NPS initiated a regular monitoring program in 1985.

Within the steep terrain of the Ozarks, storm runoff from unpaved roads and cleared land carries both fine and coarse sediments to streams. This results in unstable stream channels, eroding stream banks, and degraded aquatic habitat. While rigid stability is not natural to a free-flowing river, some of the channel instability occurring on the Buffalo River is the result of both current and historic land use practices within the watershed. Determining the precise origin of changes at each site is difficult and sometimes impossible.

A proposal for water impoundments was the key issue leading to the establishment of Buffalo National River. BNR's enabling legislation prohibits the federal licensing of water-related projects on or directly affecting the Buffalo National River. The potential development of impoundments or diversion projects on major tributaries outside the BNR boundaries remains a local issue and obtaining instream flow data to address this issue is a critical need.

3.2.2 *Environmental Consequences*

Water resource impacts were qualitatively assessed using both the presence or absence of surface water resources, literature reviews, and mitigation measures.

3.2.2.1 Alternative 1 – No Action

Proposed activities with the potential to impact water resources include building fire lines, use of fire retardants and foam suppressants, thinning, and prescribed fire.

The two principal impacts to water quality stem from: 1) erosion-induced suspended sediments, turbidity, and sedimentation, and 2) toxic effects from fire retardants and foam suppressants. In addition, intense fires may introduce large quantities of organic material (ash) into aquatic systems, blown in by wind or transported by runoff. The prescribed fire associated with this alternative should largely avoid large, intense fires.

Increased soil erosion can result from loss of vegetative cover during a fire as well as from ground crew activities engaged in suppression activities. These could lead to turbidity and sedimentation of surface water resources in the park, including Buffalo River and its tributary streams. Turbidity and sedimentation can alter the hydrologic regime of surface waters and adversely impact aquatic habitats, invertebrates and fish. Diligent adherence to Minimum Impact Suppression Tactics (MIST) will reduce water quality problems from suppression efforts. However, a large, intense fire – which has a small possibility of occurring under this alternative –

has a high probability of resulting in short-term, localized, moderate adverse impacts on water quality from erosion, turbidity and sedimentation.

The use of fire retardants and/or foams could potentially cause significant temporary to short-term impacts to water quality and aquatic life if misapplied or mishandled (USDA Forest Service, 2000a). Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it temporarily lethal to fish and other aquatic organisms; the principal toxic component of retardant chemicals in aquatic systems is ammonia (Adams and Simmons, 1999). Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. For example, if a 800-gallon drop is made into a fast flowing river, it is likely that the lethal effects to aquatic resources will be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic levels to persist for some time (USDA Forest Service, 2001).

After an extensive review of the literature, the USEPA published a regulation (40 CFR Ch. 1 (122.27 – 122.3) regulation that deemed the use of retardants and foam suppressants in firefighting as a Cataclysmic Release. This ruling views their use as a necessary tradeoff in order to prevent the greater destruction of aquatic ecosystems from fire-caused silting, suspended solids and pH changes, than the possible loss of fish from an inadvertent retardant drop into a water body (USDA Forest Service, 2000a). The USEPA Office of the General Council reviewed this ruling and concurred that fire retardants and foams are neither subject to Point Source Regulations nor the National Pollution Discharge Elimination System (NPDES) procedures under the Federal Clean Water Act. Nevertheless, scientific studies state unequivocally that direct application of fire retardant to waterways should be avoided.

3.2.2.2 Alternative 2 – Preferred Alternative

General water resources impacts under Alternative 2 would be similar to those described under the No Action Alternative.

3.2.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

In a typical year, implementing Alternative 3 will produce long-term, localized, minor impacts on waters in BNR. Impacts from any one wildland fire or suppression effort on water quality will tend to be short-term, localized and minor in intensity. However, as a result of infrequent but large wildfires that will probably occur under this alternative, impacts to water quality would be short-term, regional, and moderate to major in intensity.

In comparison with Alternative 1, since all wildland fires will be suppressed and no prescribed fires will be undertaken, there will be less impact to water quality from loss of vegetation cover and subsequent erosion, runoff, and turbidity. However, greater quantities of fire retardants and suppressants will be used in this alternative, especially during occasional large wildfire suppression efforts, increasing the risk of temporary toxic impacts to water quality and aquatic life.

Conclusion

The implementation of Alternatives 1 and 2 would not impair water resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of BNR or opportunities for enjoyment of BNR, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents. However, Alternative 3 (complete suppression and no prescribed fires) could occasionally (perhaps several times per century) result in sizeable, difficult-to-control wildfires. These could burn many acres, exposing soils to erosion, and they would also necessitate large suppression efforts, including the use of fire lines, retardants and suppressants. The combination of the hot fire, burning vegetation and exposing soils, and the suppression efforts, could lead to a temporary impairment of water quality in portions of BNR.

3.3 FLOODPLAINS AND WETLANDS

3.3.1 *Affected Environment*

Executive Order 11988 on Floodplain Management requires all Federal agencies to take action to reduce the risk of flood loss, to restore and preserve the natural and beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. Because many wetlands are located in floodplains, Executive Order 11988 has the secondary effect of protecting wetlands.

Executive Order 11990, Protection of Wetlands, states an overall wetlands policy for all agencies managing Federal lands, sponsoring Federal projects, or providing Federal funds to State or local projects. It requires Federal agencies to follow avoidance/mitigation/ preservation procedures with public input before proposing new construction projects.

In December 1982, rainfall in the Buffalo River watershed led to a discharge along the river that peaked at 158,000 cubic feet per second (Neely, 1985). This discharge, with a recurrence interval estimated at 65 years, caused widespread flooding along the Buffalo River. Even greater magnitude floods with recurrence intervals of 100 and 500 years have greater velocities, rise higher, and spread further across the floodplain. The relatively sleep slopes and narrow widths of the Buffalo River make it susceptible to flash flooding.

During floods, the Buffalo carries large amounts of debris, as do most rivers. Usually this does not pose a threat to bridges because most are either low-water bridges or highwater bridges that span the channel with very little contraction. However, debris buildup on houses, barns, and other structures within the floodplain does increase the likelihood of these structures failing.

BNR includes a number of facilities, such as campgrounds and river access points, that are located beside the river and thus exposed to flooding. However, while floods may on occasion lead to temporary closure of such facilities, they do not generally badly damage or destroy them.

Except for aquatic habitats associated with the river and its tributaries, BNR is not particularly known for wetlands (Cowardin, et al., 1979). It contains no marshes, swamps, or bogs of note.

Fires would rarely burn in wetlands and floodplains and have little likelihood of causing major changes to their vegetation or structural integrity.

3.3.2 *Environmental Consequences*

The study team qualitatively assessed impacts to floodplains and wetlands by examining the hydrologic features and processes of BNR, the location of developed areas, and comparing these with the predicted effects of wildland and prescribed fires, fire management activities, and fire suppression efforts.

3.3.2.1 Alternative 1 – No Action

Alternative 1 would result in generally negligible to minor impacts on floodplains and wetlands in the park. As indicated above, fires, especially large, intense fires, can increase the rate of runoff by stripping vegetative cover and disturbing duff, litter, soils, reducing the "sponge" effect of the forest. This in turn can raise the peak of the hydrograph of streams in affected watersheds and sub-watersheds, that is, increasing the volume and velocity of waters flowing in streams during and immediately after storm events. This pulse of water can then produce some level of flooding, scouring, streambank erosion, and sedimentation along tributary streams of the Buffalo River. However, the discharge of the river is so much larger than that of any one tributary that it will be raised only marginally by this greater pulse of water.

By allowing wildland fire use and prescribed burns over all but FMU #3 (developed areas and their buffers), Alternative 1 generally would not permit the buildup of fuels that could eventually lead to catastrophic blazes. In any case, most of the streams within BNR are in areas that lack substantial development in adjacent and downstream floodplains that could be damaged by flooding.

Alternative 1 would have negligible effects on BNR's modest wetland resources.

3.3.2.2 Alternative 2 – Preferred Alternative

General water resources impacts under Alternative 2 would be similar to those described under the No Action Alternative.

3.3.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

In most years, floodplain impacts would be similar to or even less than those described under the No Action Alternative. However, due to the occasional larger, more intense fires likely to occur under this alternative (from the fuels buildup that suppression results in over time), and resultant damage to soils, flooding in affected watersheds and sub-watesheds soils would potentially be greater than in the two previous alternatives. Flood discharges along the Buffalo River itself, nevertheless, would not be affected, due to their much greater volume.

Conclusion

The implementation of any of the alternatives would not impair floodplain and wetland resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR park, (2) key to the natural or cultural integrity of BNR or opportunities for enjoyment of BNR, and (3) identified as a goal in the BNR's general management plan or other National Park Service planning documents.

3.4 VEGETATION

3.4.1 *Affected Environment*

Plant communities at Buffalo National River are rich and diverse. The ridges, bluffs, hillsides and valleys provide a variety of habitats, supporting over 1,500 species of plants. The major forest types are the Floodplain, Mixed-Hardwood, Oak-Hickory, Oak-Pine, Cedar Glade and Beech. Forests, cultivated fields, or abandoned fields at different stages of ecological succession are present throughout the area.

BNF is located within the Oak-Hickory Forest Association (USDOI, 1978). Six oak and three hickory species predominate in the Buffalo watershed. White, black, blackjack, chinquapin, post, and northern red oaks are plentiful, as are mockernut, black, and shagbark hickories. Winged elm, red maple, sassafras, and persimmon are also present, in addition to walnut, hackberry, black gum, shortleaf pine, redcedar, sweetgum, and more than 40 other tree species.

Many of the tributary drainages represent unique botanical areas with relic plant communities surviving regional climate change due to micro-climatic conditions created along steep north-facing slopes.

Azalea, redbud, serviceberry, and dogwood dominate the understory and shrub layers and provide showy displays of flowers and blossoms in the spring and early summer. In autumn, the color changes of the deciduous, broad-leaf trees can be spectacular.

Dominant species define each of the of the dominant plant communities found at BNR. A primary source of species richness is found in the herbaceous layer, which contains components from both the tallgrass species and deciduous forest biomes.

In the Forest Oak/ Dry Woodland community dominant species are white oak (Quercus alba), black oak (Q. velutina), white hickory (Carya tomentosa) and sweet gum (Liquidambar styraciflua) *Quercus stellata (post* oak), *Pinus echinata* (shortleaf pine), and *Carya* spp. (hickory). The subcanopy often *consists of Amelanchier arborea* (serviceberry) and *Cornus aromatica* (fragrant sumac). Herbaceous cover is sparse and dominated by *Pteridium aquilinum* (bracken fern), *Desmodium* and *Lespedeza* spp. (bush clover). Mosses and lichens are often conspicuous on rock or bare soil. .Dense thickets of rivercane are found in associated riparian areas.

The Open fields plant community is codominated by fescue (Festuca arundinacea), sericea

lespedeza (Lespedeza capitata), bluegrass (Poa pratensis), wingstem (Verbesina virginica). Little bluestem (Schizachyrium scoparium) is a notable component of about 25% of surveyed open field areas. Box elder (Acer negrundo) and winged elm (Ulmus alata) also make a dominant presence in many sites. Dense thickets of rivercane are also found in association with many open field sites.

One of BNR's more unique vegetative communities is known as the savanna or "post oak barrens," characterized by open areas of widely scattered trees and a very diverse herbaceous ground cover. On these sites, a particular balance of natural forces prevents "normal" succession from leading to the development of a forest community. The herbaceous ground cover includes both dry-forest and dry-prairie grass and herbs while the woody overstory is composed of several species of scattered, stunted oaks and black hickory. Over the past 50 years, eastern red cedar (*Juniperus virginiana*) has increased dramatically on the savannas. As the basal area of this species, blackjack oak and black hickory rises, overall species diversity declines as the herbaceous layer is shaded out. Frequent fire occurrence is believed to have been a primary factor in the maintenance of the savanna community (NPS, 1995).

Dominant species in the Glade Transition/Post oak barrens include Quercus stellata (post oak), Juniperus virginiana (eastern red cedar), Ulmus alata g (winged elm), Rhus copallina (winged sumac), Quercus muhlenbergii (chinquapin oak), Quercus marilandica (blackjack oak), Schizachyrium scoparium (little bluestem), Andropogon gerardii (big bluestem), Sorghastrum nutans (Indian grass), Panicurn virgatum (switch grass), Rudbeckia spp., and Liatris spp. (blazing star). Mosses and lichens are also often conspicuous over exposed rock in the Glade Transition/Post oak barrens.

A vegetation map, produced in 1978, utilized general vegetation classification systems. Recent ground truth attempts have confirmed the need to revise and update this existing map. Logan (1992) surveyed cedar glades of BNR, documenting the location and status of 54 sites and providing voucher specimens of one hundred ninety-three species. A botanical survey of a unique post oak barrens community in the Lower Wilderness (Logan, 1993) documented 255 plant species. Permanent vegetation plots were established and a collection of voucher specimens were included as part of the survey. Grabner and Struckhoff (2002) found a total of 271 groundflora species in 18 plots in post oak barrens, and reported dramatic increases in richness values after the prescribed application of fire.

Species lists of plants found on Buffalo National River may be found in the Interactive Species Database at the University of California, Davis.

The fire history as it relates to the vegetation of BNR was discussed in Section 1.3 above.

THE TOP THREE INVASIVE PLANT SPECIES AND NOXIOUS WEEDS OF PRIMARY CONCERN AT BNR ARE THE FOLLOWING:

1. **Eastern redcedar** (*Juniperus virginiana)*
   Eastern redcedar is a widely distributed, native conifer growing in all states east of the Great Plains. It is a prolific invader of thin-soiled glades, dry woodlands, abandoned fields, prairies, and disturbed forests. If left to itself, it forms stable communities. This condition exists throughout many areas of Buffalo National River. Eastern redcedar is especially effective in shading out the desirable native grasses that are managed for under BNR's Open Fields Program.

2. **Sericea lespedeza** (*Lespedeza cuneata*)
   Sericea was first brought to the United States from Japan in the 1890s. It is a legume, but furnishes very little nitrogen to surrounding plants. It is an aggressive colonizer of disturbed sites, and will often reduce or eliminate competing vegetation, including the native plant species for which BNR actively manages.

3. **Tall fescue** (*Festuca arundinacea)*
   Tall fescue is an exotic, cool-season forage grass and was introduced to North America from northern Europe, where it is native. The palatability and nutritional value for wildlife varies, but studies have suggested that, due to the density of tall fescue root mats and because of the allelopathic substances produced, tall fescue is not desirable on sites where management intent is for wildlife and plant diversity. It can be invasive in native vegetation, and is treated through prescribed burning and herbicide application in favor of native warm season grasses as part of the Open Fields Management Program at BNR.

3.4.2 *Environmental Consequences*

Impacts to vegetation from the alternative FMP's were qualitatively assessed by means of a literature review of forest and fire ecology in the region, consultation with foresters, botanists and fire specialists.

3.4.2.1 Alternative 1 – No Action

Implementation of this alternative would have a generally positive impact on BNR's vegetation, by utilizing both Wildland Fire Use and prescribed fire to mimic more natural fire return intervals and thus simulate the natural role of wildland fires in this fire-adapted landscape. Native fire-adapted and fire-dependant plant species would flourish, soils would be rejuvenated with nutrients on a regular basis, which will encourage plant growth, and dense undergrowth would be controlled. Larger trees would generally not be damaged by the high-frequency, low-intensity fire regime that would be established under this alternative. However, even relatively low-intensity prescribed fires can kill den trees, snags, and fruit trees on occasion (Hunter, 1990).

Suppression activities that resulted in soil disturbance (fire lines) would make those disturbed areas more susceptible to noxious weed infestation. Disturbed areas would be seeded with native grasses. Thinning and fire activities would retard the encroachment of woody tree species into

meadows BNR wishes to maintain as clearings and would reduce prevent hazardous fuels buildup on BNR.

With proper planning and execution, the prescribed fire program used under this alternative can manipulate vegetation to produce healthier habitats as a background for the river area. Fires tend to provide a pulse of readily available nutrients for plant growth, as well as temporarily improving the quality of that growth for wildlife, including more nutrients and protein and less lignin and crude fiber (Hunter, 1990). At the same time, fuel management, using both mechanical means and prescribed fire, can reduce the risk to the cultural and historic resources and NPS infrastructure on BNR. Implementation of this alternative would achieve both Master Plan and RMP objectives of Buffalo National River.

In general, BNR's invasive plant species and noxious weeds are amenable to treatment by fire and other means that would occur under this alternative. Eastern redcedar is very susceptible to fire and current management strategies are to kill invasive trees through broadcast burning or a combination of mechanical thinning and burning. With sericea lespedeza, a combination of fire, mowing and herbicide treatment offers the most effective control. Tall fescue can be controlled by a prescribed fire in conjunction with herbicide application.

3.4.2.2 Alternative 2 – Preferred Alternative

General vegetation impacts under Alternative 2 would be similar to those described under the No Action Alternative, largely positive.

3.4.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

A policy of fire exclusion at Buffalo National River would result in a reduction of shade-intolerant tree species, first an increase in density and later a loss of the herbaceous and shrub understory, and a gradual accumulation of hazardous fuels. In particular, noxious weeds and/or fire-intolerant plant species would continue to increase in number and out-compete fire-adapted and fire-dependent native species. Over the mid- to long-term, under Alternative 3, the buildup of dangerous fuels in the form of highly flammable litter and/or an unnaturally dense midstory with ladder fuels that can carry a surface fire into the forest canopy, would likely change the role of fire from that of stand management to stand replacement (Hunter, 1990). Thus, over time, this alternative would increase the very hazard that it aims to prevent.

Alternative 3 would have significant adverse impacts on Buffalo National River's vegetation.

Conclusion

Implementation of Alternatives 1 and 2 would be generally beneficial. Neither of these alternatives would impair vegetation resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of BNR, and (3) identified as a goal in BNR's general management plan or other National Park Service planning documents.

In contrast, implementation of Alternative 3 would impair vegetation resources or values since it would not result in the restoration of the historic fire regime of the benefit native vegetation and their plant communities. Furthermore, over time, it would facilitate the buildup of combustible matter in the understory and on the surface, providing excessive tinder and causing more damaging stand-replacement fires when fires do occur.

3.5 WILDLIFE

3.5.1 *Affected Environment*

3.5.1.1 General

Whitetail deer, raccoon, opossum, bobcat, mink, bear and beaver are common on the Buffalo National River. Elk populations have slowly increased since their introduction to this area in 1981, and sightings are common on the upper river (NPS, 1998).

The loss of major predators such as the red wolf and the mountain lion means that populations of many ungulate species are regulated by hunter take and disease, and may fluctuate at or near ecological carrying capacity. Black bear are native to the Ozarks and are monitored to a limited extent by the Arkansas Game & Fish Commission. No population monitoring of black bears is being done on or adjacent to BNR. While few nuisance animal complaints occur within BNR, the potential for bear-visitor interactions is always present and cooperation with the Arkansas Game & Fish Commission in bear management is essential for visitor safety as well as protection of the species.

Nuisance beaver damage and associated impacts have historically been controlled by harvesting these fur-bearers. However, data on population distribution are needed to assess this problem and issues such as the presence of *Giardia*, mitigation of flooding from beaver dams, and the influence of beaver on riparian vegetation and channel stability.

Nuisance damage from feral pigs is a concern to BNR managers and efforts to control their numbers and reduce the extent of soil and vegetation disturbance associated with their foraging are underway.

Little is known regarding many animals within the park and the staff relies on visual sightings by individuals of variable levels of experience and expertise to confirm the existence of many species. Little data exist on the occurrence or distribution of reptiles and amphibians, expansion of black bear populations, and neotropical migratory birds.

However, recent surveys during 1994-1996 added to the park's knowledge of species of concern. Studies done in 1994 of the Cecil Creek area in conjunction with a perceived threat of spraying for a gypsy moth infestation documented the following: 93 species of *Lepidoptera* in 19 families, 71 genera of terrestrial insects including one new species and several state records, four species of aquatic snails and twenty-seven terrestrial snail species including ten county and one state record, and a herpetefaunal survey which identified 34 species. Subsequent snail surveys have documented 57 species and 15 families. Finally, recent biodiversity studies of three springs

associated with Fitton cave and two tributaries of the Buffalo River which focused on aquatic insects and crustaceans identified several species and high species richness for all areas studied.

3.5.1.2 Game species

Hunting is permitted within BNR in accord with regulations set by the Arkansas Game and Fish Commission. Popular game species include white-tail deer, gray squirrel, cotton-tail rabbit, wild turkey, and black bear. Several species have been re-introduced within or adjacent to the park since its establishment including ruffed grouse, turkey and elk. Data regarding the amount of game animals taken within BNR are not available. The NPS and the State have agreed to cooperatively manage BNR as a separate state wildlife management area.

3.5.1.3 Fisheries

Some 64 species of fish have been documented in Buffalo River. The Master Plan generally endorses a non-intensive fisheries management program, which accepts the natural limitations of the stream's productivity. A 1995 survey of the river documented the presence of the Ozark shiner (*Notropis ozarcanus*), a Federal candidate fish species. Another survey completed in 1996 focused on freshwater mussels in an attempt to replicate a 1912 survey. Twenty-one species of mussel were found which occurred in 1912 and many of the original beds were relocated.

3.5.2 *Environmental Consequences*

Impacts to wildlife and fisheries from the three alternatives were qualitatively assessed by means of a literature review of the effects of fire on wildlife habitat, consultation with biologists, mitigation measures, and professional judgment.

3.5.2.1 Alternative 1 – No Action

Proposed activities with the potential to impact wildlife include building fire lines, fire retardant use associated with suppression activities, thinning, and prescribed fires.

Habitat conditions for many wildlife species that inhabit Buffalo National River would improve with the restoration of the historic high-frequency, low-intensity fire regime characteristic of this area prior to the twentieth century. Such a fire regime would help restore and enhance the variety and diversity of native plant and wildlife habitats. Nutrients released to plants through the fertilization effects of ash would provide an important source of nutrition for wildlife in the area. As stated above, in the aftermath of a fire, for a season or more, plant growth tends to be more nutritious than that of unburned areas, containing more protein and nutrients and less lignin and crude fiber. While some trees (including fruit and mast trees) would be killed from the effects of fire, these dead standing trees (snags) would be left as these provide important habitat for a variety of wildlife species. Snags that are deemed hazardous trees would be removed.

All the fire management activities could result in the temporary displacement of wildlife or in the mortality of individuals. The loss of individual members of a given species, however, would not

jeopardize the viability of the populations on and adjacent to BNR. It should be stressed that all species of wildlife native to the region are adapted to and can survive fire. Others prefer the forage and browse that will emerge after fires; still others, such as deer, ruffed grouse, and turkey, may actually be dependent upon the habitat conditions created by fires (Hunter, 1990).

3.5.2.2 Alternative 2 – Preferred Alternative

General wildlife impacts under Alternative 2 would be similar to those described under the No Action Alternative.

3.5.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

In the long-term, the absence of prescribed fire in the Buffalo National River ecosystem would lead to increased fuels and would eventually result in more intense and severe fires, despite suppression efforts. Such a fire regime would not help restore and maintain the forest's native diverse plant and wildlife habitats. While the potential for individual mortality would increase under this alternative, the viability of populations on and adjacent to BNR would not be affected. Nevertheless, between successive wildfires, the long periods of fire exclusion from wildlife habitat throughout BNR would result in an overall deterioration in the quality of that habitat for most species of wildlife native to the region, which would be a significant adverse effect.

Conclusion

Implementation of Alternative 3 would impair wildlife resources and values since it would not restore the historic fire regime necessary for the perpetuation and restoration of native plant and wildlife species and their habitats. This goal is identified in the BNR's Master Plan, Resource Management Plan, and Fire Management Plan. Implementation of Alternatives 1 and 2 would impair wildlife resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of BNR or opportunities for enjoyment of BNR park, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents. Indeed, Alternatives 1 and 2 are likely to have beneficial effects on BNR's wildlife resources.

3.6 THREATENED AND ENDANGERED SPECIES

3.6.1 *Affected Environment*

3.6.1.1 Flora

No Federally-listed vascular plants are known to occur at Buffalo National River. However, a rare

plant survey of seeps and springs in conjunction with the National Park Foundation and Canon U.S.A identified 42 populations of rare plants (NPS, 1999). The U.S. Fish and Wildlife Service reports one species at Buffalo National River that is listed as state-threatened – the Alabama snow wreath – and several species and natural communities considered "Inventory Elements" on the state of Arkansas's list. Inventory Elements are those for which the Arkansas Natural Heritage Commission is currently conducting active inventory work, and for which there is conservation concern. Proactive management may keep such species off the Federal Endangered Species list (Dikeman, 2001). The following are state-listed plant species and communities found on Buffalo National River:

Scientific Name	Common Name	Status
Castanea pumila var. *ozarkensis*	Ozark chinquapin	State Inventory
Delphinium newtonianum	Moore's larkspur	State Inventory
Delphinium treleasei	Trelease's larkspur	State Inventory
Neviusia alabamensis	Alabama snow wreath	State Threatened
Tradescantia ozarkana	Ozark spiderwort	State Inventory
Trillium pusillum var. *ozarkanum*	Ozark least trillium	State Inventory
Valerianella ozarkana	a corn-salad	State Inventory

Plant Communities	
Post oak savanna	-
Cane breaks	-
Glades	-

3.6.1.2 Fauna

The bald eagle occurs as a migrant and winter resident within the National River. Annual winter eagle surveys indicate widespread winter use of the river with a large concentration (one or more per mile) of wintering eagles on the river downstream of Buffalo Point.

Three species of threatened and endangered bats (gray bat, Indiana bat, and Ozark big-eared bat) are found at Buffalo National River. A fourth bat species, Eastern small-footed bat, is a state Inventory Element. Hibernating, bachelor and maternity colonies are known to exist and are monitored during the winter and summer season. Fourteen caves and three mines have been identified as habitat used by the gray bat, Indiana bat, or Ozark big-eared bat. A system for cave closure and permitting is utilized for resource protection and recreational activities. Further surveys are needed for existing colonies and to discover new populations.

The USFWS reports the following listed animal species on Buffalo National River (Dikeman, 2001):

Scientific Name	Common Name	Status
Cyprogenia aberti	western fanshell (shellfish)	State Inventory
Rimulincola divalis	beetle	State Inventory
Corynorhinus townsendii ingens	Ozark big-eared bat	Federally Endangered
Limnothlypis swainsonii	Swainson's warbler	State Inventory

Myotis grisecens	Gray myotis (moth)	Federally Endangered
M. leibii	Eastern small-footed myotis	State Inventory
M. sodalis	Indiana myotis (moth)	Federally Endangered
Notropis ozarcanus	Ozark shiner (fish)	State Inventory
Adjacent lands		
Haliaeetus leucocophalus	bald eagle	Federally Threatened

In addition to the above listed species, the National Park Service indicates that the alligator snapping turtle (*Macroclemys temmincki*) has been documented within the National River, but no systematic reptile studies/surveys have been implemented. Also, the Neartic Paduniellan Caddisfly, which is a candidate species and an Ozark endemic, has been found in small numbers at two sites on the upper reaches of the Buffalo National River.

3.6.2 *Environmental Consequences*

Impacts to threatened and endangered species from the three alternatives were qualitatively assessed by means of a literature review of the effects of fire on these species, consultation with biologists and agencies, and professional judgment.

3.6.2.1 Alternative 1 – No Action

Much of the flora and fauna native to ecosystems with natural fire regimes, including those now threatened or endangered, had to be fire-adapted to survive in those ecosystems in the first place (Rusterholz, 2002). For example, ground-nesting birds disturbed by fire can often re-nest later (Eliason, 2002). A number of plant species are even fire-dependent, so that to the extent fire is reintroduced into the landscape, this tends to be beneficial. To the degree fire continues to be excluded, this tends to be harmful. Thus, attempting to re-establish the historic fire regime, as does the No Action Alternative, should largely benefit sensitive and listed species. Furthermore, the three state-listed natural communities – post oak savanna, cane breaks, and glades – should all benefit from prescribed fire and WFU to prevent woody encroachment which would otherwise tend to occur.

Overall, the fires permitted (both Wildland Fire Use and prescribed burns) under Alternative 1 will not have serious negative consequences for populations of native plants and animals, including those that are threatened, endangered or otherwise listed. This is not to say that prescribed burns, and to a smaller extent, fire suppression activities such as line-clearing, cannot cause temporary displacement or even direct mortality of listed species, and for this reason, the NPS needs to be proactive in averting these impacts.

While there would be the potential for very minor smoke-related impacts on bat hibernacula during prescribed fire activities in specific locations, adherence to a prescribed burn plan that allowed for adequate smoke dispersion would minimize and/or eliminate this potential impact. In addition, the timing of prescribed burns can be adjusted so as to avoid impacts to nesting or denning species of animals or at other critical times for listed plants and animals.

In Alternative 1, all known sensitive plant locations, or any other listed species known to be present which fall within or in close proximity to prescribed burn units, will receive mitigation in prescribed fire burn plans to ensure they are not impacted. The Arkansas Field Office of the USFWS has compiled a list of recommendations with regard to avoiding adverse effects on threatened and endangered species from fire management activities (Dikeman, 2002). The NPS will consult and coordinate with the USFWS to ensure that prescribed fire and other fire activities will minimize detrimental effects and maximize benefits to all known listed species in BNR.

3.6.2.2 Alternative 2 – Preferred Alternative

Impacts to listed and sensitive species under Alternative 2 would be similar to those described under the No Action Alternative.

3.6.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

Over the long term, the absence of prescribed fire and the attempted suppression of all wildfires within the Buffalo National River ecosystem would lead to "unnatural" changes in habitat structure and species composition. In general, these changes would probably not be advantageous for native species of plants and animals that are adapted to or dependent on the historic fire regime of the area. Moreover, the excessive increase in fuels and would eventually result in more intense and severe fires (i.e. a low-frequency, high-intensity fire regime), in spite of concerted suppression efforts. Such a distorted fire regime would not help restore and maintain the forest's native diverse plant and wildlife habitats. Overall, therefore, Alternative 3 would most likely result in a deterioration of the habitat conditions preferred by most threatened and endangered species at BNR.

Conclusion

Implementation of Alternative 3 would likely cause moderate to major adverse effects on the populations of several state-listed plant species and natural communities, and minor to moderate impacts on sensitive animal populations. Thus, Alternative 3 will impair these vital resources. In contrast, implementation of Alternatives 1 and 2 would not impair wildlife resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of BNR, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents. Overall, and over the long-term, Alternatives 1 and 2 are likely to benefit BNR's threatened and endangered species and rare plant communities.

3.7 AIR QUALITY

3.7.1 *Affected Environment*

Under the terms of the 1990 Clean Air Act amendments, the park majority of the park is designated as a Class II quality area. The Upper Buffalo Wilderness Area located in the Upper Buffalo Ranger District is designated a Class 1 quality area. By definition, Class II areas of the

country are set aside under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than Class I areas.

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA, 2000a). The area of Arkansas in which the National River is located is in attainment for each of the NAAQS (Davis, 2002).

The State of Arkansas has a ban on open burning. However, exemptions are made for "…controlled fires used for purposes of forest and wildlife management, provided that such fires are used and burned when winds are blowing away from population areas which might be affected" (Arkansas Pollution Control and Ecology Commission, 1999). The state does not require the National Park Service to apply for a permit or even provide notification for prescribed fires (Davis, 2002).

Arkansas' air quality laws and regulations are available on-line at the state's Department of Air Quality website at http://www.adeq.state.ar.us/regs/ar_env_laws.htm and http://www.adeq.state.ar.us/regs/, respectively.

3.7.2 *Environmental Consequences*

Impacts to air quality were qualitatively assessed by means of a review of the literature and pertinent laws, guidance and regulations, consultation with experts and regulators, professional judgment, and experience with comparable actions. Specific air emissions would be quantified during the preparation of prescribed fire permit applications.

The combustion of vegetation produces various chemical compounds. These compounds include nitrogen oxides (NOx), organic compounds, carbon monoxide, and particulate matter or small particles (PM). The pollutants that affect visibility that derive from vegetative burning are PM_{10}, $PM_{2.5}$, nitrates, ozone, organic carbon, and elemental carbon. Ozone, a measurable constituent of "smog" or haze, is not directly produced by fires, but as a byproduct of the chemical reaction of other combustion products (NOx and volatile organic compounds or VOC's). About 90 percent of smoke particles from wildland and prescribed fires are PM_{10} and about 70 % are $PM_{2.5}$ (MNICS, 2001).

Some concern around the country has been expressed about one toxic pollutant in particular that is released in trace amounts by forest fires into the air – dioxin (Gossman Consulting, no date). Dioxins are a family of chemical compounds that scientific studies have shown can cause a number of adverse health effects (USDA FSIS, 1999). Among other things, dioxins are known endocrine disrupters (EMS, 2001); in humans, heart disease, cancer, and increased risk of diabetes have also been linked to dioxin (NIEHS, 2001). Dioxins deposited in the environment can be taken up by plants and then animals and aquatic organisms, growing more concentrated as they ascend the food chain (a phenomenon known as "biomagnification") so that animals, especially carnivores, have higher concentrations than herbivores, plants, water, soil, or

sediments. Within animals, dioxins tend to accumulate in fat. Food accounts for 95 percent of human exposure to dioxin (TRI, no date). However, levels of dioxin in food have been cut in half in recent years as a result of growing awareness and regulation.

BNR's prescribed fire program under the existing FMP is small enough that dioxin emissions would be negligible. The presence of dioxins and other synthetic organic chemicals and heavy metals released by human activity near and far into the park environment is certainly a source of concern and merits long-term monitoring. However, at present, there is no research at present that would indicate that dioxin concentrations in the Buffalo National River environment are high enough to be having a detrimental effect on wildlife populations or nearby human residents.

One of the main factors determining the degree of air pollution from wildland fires is smoke dispersion. Smoke dispersion is a function of ventilation, which refers to the process within the atmosphere that mixes and transports smoke away from its source. Ventilation is a function of stability, mixing height, and transport winds. Mixing height is defined as the upper limit of a mixed layer in unstable air, in which upward and downward exchange of air occurs. The transport wind is the arithmetic average (speed and direction) of wind in the mixing layer.

3.7.2.1 Alternative 1 – No Action

Smoke consists of dispersed airborne solids and liquid particles (aerosols), collectively referred to as particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effects. They include:

1. Avoidance - This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions;

2. Dilution – This strategy ensures proper smoke dispersion in smoke-sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems are unstable, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground; and

3. Emission Reduction – This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand, e.g. removing firewood, reduces the amount of fuel available. Conducting prescribed fires when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or by using certain firing techniques such as mass ignition.

If weather conditions changed unexpectedly during a prescribed burn, and there was a potential for violating air quality standards or for adverse smoke impacts on sensitive receptors, BNR would implement a contingency plan, including the option for immediate suppression. If prescribed fires were conducted throughout BNR over the next five years, considering the relatively small number of acres and fuel that would be affected, prescribed fires would not likely violate daily national or state emission standards and would cause only minor and temporary air quality impacts. The greatest threat to air quality would be smoke impacts on sensitive receptors (nearby residents), however, the general paucity of sensitive receptors immediately adjacent to BNR minimizes and/or eliminates this potential air quality impact.

3.7.2.2 Alternative 2 – Preferred Alternative

General air quality impacts under Alternative 2 would be similar to those described under the No Action Alternative.

3.7.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

Under Alternative 3, air quality impacts from wildland fires would be reduced by suppression efforts. Also, without prescribed burns the smoke normally generated by these would be avoided. Thus, in a typical year, this alternative would generate fewer emissions than either of the previous two. However, Alternative 3 would lead to greater quantities of fuels accumulating over a longer interval, which would ultimately result in larger (but less frequent) wildland fires. At these times, much greater amounts of smoke will be generated, probably large enough to exceed the NAAQS for at least particulate matter, with a consequent temporary impairment of BNR's air quality.

Conclusion

The implementation of Alternatives 1 and 2 would not impair air quality resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural integrity of BNR or opportunities for enjoyment of BNR, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents. In most years, Alternative 3 would cause even fewer emissions than Alternatives 1 and 2; however, every few decades it will cause larger wildfires with concomitant smoke generation in significant quantities.

3.8 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

3.8.1 *Affected Environment*

The clean, free-flowing waters of the Buffalo National River, set off by the surrounding bluffs, cliffs, woods and pastoral lands, constitutes a visual resource enjoyed by visitors. Visitation at Buffalo National River runs about 800,000 a year, up from approximately 650,000 annual visitors a decade ago. BNR has two major highway crossings, a number of smaller ones, and 47 access points, providing for dispersed entry to this linear park.

Popular outdoor recreational and educational activities at BNR include hunting, fishing, camping, hiking, interpretive programs, and of course, floating the Buffalo by raft, canoe, or kayak:

- Non-developed sections of BNR are open to hunting under Arkansas Game and Fish Commission regulations, and requires a state hunting license. Depending on the game, the seasons run from early September until April and from mid-May to mid-June (for squirrel only).

- Fishing is a popular pastime in the park. Long pools and shallow riffle complexes provide opportunities for game fish like the smallmouth, largemouth, spotted and Ozark bass, catfish, and a variety of panfish. Anglers utilize both bank fishing and float fishing in flatbottomed johnboats. Fishing is governed by state regulations.

- BNR contains 14 designated, auto-accessible campgrounds that operate on a first-come, first-served basis. Campgrounds typically provide water and restrooms. Stays are limited to two weeks. Most campgrounds offer excellent river access. Backcountry camping is permitted in the Ponca and Lower Buffalo Wilderness Areas.

- Short, day-use trails are located at Lost Valley, Pruitt, Tyler Bend and Buffalo Point, while longer trails with opportunities for backpackers are found in the Ponca and Lower Buffalo Wilderness Areas. Traces of former roads also lure hikers. Hiking is best in winter when foliage has disappeared, and snakes, ticks and chiggers are dormant.

- BNR provides interpretive programs at Buffalo Point, Tyler Bend, Pruitt, Ozark and other locations in the spring, summer and fall. Campfire programs, guided nature walks and hikes, guided canoe tours and Ozark craft and folk music programs are all offered.

- Floating on the river is one of the primary recreational uses of the Buffalo National River. Slow-moving reaches of the river are particularly inviting to beginning canoeists. Concessionaires rent canoes, and provide all equipment needed except personal gear and food. Motorized craft restricted to 9.9 horsepower are allowed on the river but are seldom used beyond the lowest stretches due to the abundance of shallow shoals found in the middle and upper river stretches.

A visitor center is at Tyler Bend and three ranger stations at Buffalo Point, Tyler Bend and Pruitt. The National River's headquarters is located outside BNR proper in Harrison.

3.8.2 *Environmental Consequences*

Recreation impacts were qualitatively assessed in light of the intensity and duration of fuel treatment activities as they related to visitor use and experience. Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape.

3.8.2.1 Alternative 1 – No Action

There would be some short-term reduction in scenic integrity and visitor use during and immediately following any thinning, prescribed fire, or wildfire suppression activities from the presence of engines and thinning or fire crews. Short-term reduction in scenic integrity, however, would be minor because 1) fire management activities would involve only short-term presence of vehicles and people, 2) stumps would be cut flush with the ground, 3) smoke accumulation would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion.

Any prescribed fires would likely produce short-term smoke accumulations that impact local visual quality. Minimizing smoke emissions through best management practices and prohibiting prescribed fires during times of peak recreation use would reduce any short-term impacts.

Visitor use would also be temporarily affected under this alternative since access to those locations where crews were conducting thinning, prescribed fire, and suppression activities would be restricted. Since prescribed fires would not usually be ignited during the summer months of peak park visitation, and since only a small portion of BNR would be subjected to treatment at any one time, prescribed fire and thinning activities on the surface of BNR would not significantly impact the visitor use and experience. Public education about the role of fire at BNR and the positive effects it has on the park's vegetation and wildlife would benefit the visitor experience. While BNR's educational program for fire management continues to evolve, prescribed fire fact sheets, guided tours to areas that have experienced prescribed fire, and visitation during prescribed fire activities are some methods that would help educate visitors and local residents alike. It is likely that visitors who might otherwise have their experience affected by the presence of fire management activities would be less affected after exposure to this interpretive program.

With the planning cooperation of fire management personnel from Buffalo National River and other NPS units, BNR operations would not be affected under this alternative. In the event of a wildland fire within or adjacent to BNR, park operations could be temporarily affected depending on the severity of the fire and situation at hand as visitors and non-essential BNR personnel were evacuated to off-site and safe locations.

3.8.2.2 Alternative 2 – Preferred Alternative

General impacts to visitor use and experience would be similar to those described under the No Action Alternative.

3.8.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

General impacts to visitor use and experience would be similar to those described under the No Action Alternative. In the short-term, the absence of prescribed fire would result in fewer temporary impacts to visitor use and experience, however, in the long-term, it would increase the potential for more intense and severe wildland fires that could affect visitor use and experience, and BNR operations. It would also result in changes to vistas as fire-maintained openings are

lost, wildlife populations change, and vegetative communities change as a result of fire exclusion.

3.9 HUMAN HEALTH AND SAFETY

3.9.1 *Affected Environment*

As hazards exist in both wildland and prescribed burns, public and firefighter safety is always the highest priority. Smoke on roads in and adjacent to BNR is of concern. A significant amount of residential development is located near or adjacent to BNR as well. Smoke from sources on and off BNR can be a safety issue to the visiting public. The flaming front of a fire can, potentially, put unsuspecting members of the visiting public at risk. For this reason, areas affected by fire of any cause will be closed to the public. There is always a risk that curious park visitors will actually approach a fire rather than flee it. Adjacent landowners will be notified when fire, particularly wildland fire, is a threat to off-unit residential areas.

Prior to the ignition of any prescribed fire in BNR, all the burn parameters of the existing and approved prescribed fire burn plan would be met to ensure a safe and effective prescribed fire. In addition, staff would prepare brochures for the public that advise them of the time and extent of the proposed burn and educate them about the role of fire in the forests of the Ozarks. In the event of potentially hazardous fires within BNR, the Park Superintendent and Chief Ranger would coordinate public notification efforts within and outside BNR. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor and BNR staff safety would take priority over other activities.

3.9.2 *Environmental Consequences*

Human health and safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

3.9.2.1 Alternative 1 – No Action

Factors most likely to adversely impact firefighter health and safety include activities associated with wildland fire suppression efforts (accidental spills, injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Accidental spills of fire retardants and foams are the most likely to adversely impact human health & safety. Fire retardants used in controlling or extinguishing fires contain about 85% water, 10% fertilizer, and 5% minor ingredients such as corrosion inhibitors and bactericides. Fire suppressant foams are more than 99% water. The remaining 1% contains surfactants, foaming agents, corrosion inhibitors, and dispersants. These qualified and approved wildland fire chemicals have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests

(USDA, 2001). However, they are strong detergents, and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. Application of a topical cream or lotion can alleviate the effects of a retardant, and protective goggles can prevent any injury to the eyes when using foams.

Fuel break construction can pose safety threats to firefighters. Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression efforts. While each of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health & safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM2.5), and total suspended particulates (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000b).

Use restrictions applied to areas of wildland fires or prescribed fires would minimize or eliminate public human health & safety concerns resulting from smoke exposure and fire injuries. When using prescribed fire, mitigation measures, such as construction of fire lines, the presence of engines, and strict adherence to prescribed burn plans, would minimize the potential for an out-of-prescription burn or escape. Every prescribed fire is executed under specific environmental conditions (wind speed, relative humidity et al) to ensure that specific fire management objectives are being met under controlled conditions of specified fire behavior (rate of spread and flame length). Weather and fire behavior monitoring conducted during prescribed fires ensures that prescriptions are being followed. While the potential for a fire escape will always exist when conducting prescribed fires, that potential is extremely small. Recent statistics summarized by the National Interagency Fire Center in Boise, Idaho report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stevens, 2000).

3.9.2.2 Alternative 2 – Preferred Alternative

The general impacts to human health and safety under Alternative 2 would be similar to those described under the No Action Alternative.

3.9.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

In most years, the general impacts to human health and safety under Alternative 3 would be similar to those under the Proposed Action. The exclusion of prescribed fire to reduce ground fuels would eliminate the possibility of an out-of-prescription burn or fire escape. Since slash pile burning would usually be conducted during winter, the potential for escape from a slash pile burn and for a subsequent wildland fire would be very low. In the long-term, however, fuels buildup in the absence of prescribed fire would result in more intense and severe wildland fires that could be more difficult to suppress, and therefore have a greater likelihood of presenting problems for human health and safety.

3.10 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions. BNR uses a cultural resource/fire management matrix to help assess the potential effects of fire management operations on cultural resources.

3.10.1 *Affected Environment*

Buffalo National River contains numerous archeological sites, both prehistoric and historic, spanning almost 12,000 years of human history. The most common situation at BNR is the overlay of historic structures atop historic archeological sites which themselves lie atop prehistoric archeological sites. Known archeological resources are found at more than 480 sites within the BNR.

BNR has properties listed on the National Register of Historic Places (NRHP), including Cold Springs School, Rush Historic District, Buffalo River State Park Historic District, Parker-Hickman Farm Historic District, and Boxley Valley Historic District. In addition, the Erbie Historic Zone (1,500-acres, as per the 1986 Erbie Development Plan/ Cultural Landscape Report) is to be treated as if it were on the NRHP. The Collier Homestead and the Williams House may also be eligible, according to the Arkansas State Historic Preservation Office (SHPO). These resources total about 12,000 acres or more than 10 percent of BNR's jurisdiction. Added to this list are archeological sites considered eligible for the National Register, although in some areas, like Boxley Valley, they are concurrent with the registered historic district.

The prehistoric archeological resources of Buffalo River include cave and bluff shelters, open sites, structures, and objects. Open sites range from possible villages to flint-knapping workshops. Structures include below-surface remains of prehistoric house structures. Post molds indicate the use of constructed "pole house" shelters comparable to Mississippian sites found elsewhere in the Southeast. Objects include finished and unfinished tools, ceramics, fiber remnants, and plant and animal remains from food storage/preparation. Vandalism and erosion continue to be the greatest threat to the archeological resources.

Historic archeological sites cover a period beginning in the early 1800s. Known culturally-affiliated Native American groups include the Osage, the Shawnee, Caddo, Quapaw, Tunica-Biloxi, the Wichita and Affiliated Tribes, and the Cherokee, who owned the land by treaty from 1817-1828. There are also numerous sites associated with 19th and 20th century Euro-American settlement. These vary from vegetation-covered areas with no above ground resources, to the ruins of farms and larger communities and industries.

Historic structures at the National River vary from ruins associated with logging or mining to farmsteads still under occupancy. The time range extends from the 1830s to the 1950s. The List of Classified Structures (LCS) includes 257 structures. Nineteen of BNR's 37 recorded cemeteries, ranging from family plots to privately-owned cemeteries still in use, are on the LCS. There are also isolated structures in the backcountry or wilderness that still need to be evaluated. The structure list varies from roadways and bridges to mine facilities and houses. The majority of structures are within BNR's four historic districts and one eligible district – five landscapes of sharply contrasting and complementing resources:

- The Parker-Hickman Farmstead Historic District (195 acres, entered 1987), among the most significant pioneer farms in the region, contains nine buildings, all but one in good condition since preservation work in 1984 and 1988.

- The Rush Historic District (1,200 acres, entered 1987) contains 47 structures, varying from structural ruins to standing buildings. Roadways and mines are also considered part of the structural listing. This zinc-mining district is well known regionally and nationally.

- Boxley Valley Historic District (8,000 acres, entered 1987) contains the most structures of all the historic districts--145 on the List of Classified Structures. Boxley Valley, a living agricultural community, is a multiple-layer district embracing historic structures, prehistoric and historic archeological sites, and ethnographic resources. The district contains residents, active farms, and churches.

- The Civilian Conservation Corps structures at Buffalo Point (330 acres, entered 1988) constitute the fourth historic district. Structures include six rustic cabins, the lodge, picnic pavilion, and the rockwork for the roadways for the old state park.

- The Collier Homestead at Tyler Bend is eligible as a fifth district (ruling of eligibility by State Historic Preservation Officer in 1990). This 1930's homestead has four standing structures.

- Cold Springs School (one acre), a Works Progress Administration structure, is individually listed on the National Register [1992]. This structure is located within designated Wilderness and subject to Wilderness use requirements.

Other individual structures are scattered throughout BNR. Some, such as the Shaddox cabin at Pruitt, serve park interpretive functions. Others, such as the Reavis Cabin, have been adaptively

used. Certain structures are situated within designated Wilderness boundaries. The most well-known resource within Wilderness is the Eva Barnes Henderson farm. Several other structures, such as the circa-1900 church at Erbie, need determinations of eligibility.

There are no museum objects in the affected environment. However, historic objects abound in place along the National River. They range from scattered iron or other metal objects to surprisingly intact mining, milling and farming equipment: from the occasional cowbell, and horse logging hardware found in the woods to the huge boiler for the Casey stream-powered sawmill and the array of machinery in the Villines' grist mill (Boxley).

Scraps of narrow gauge tracks, drilling apparatus, an occasional ore cast and complete steam boiler dot the Rush Historic District landscape. Several of the seven huge iron kettles (remnants) from the Confederate gunpowder works at Cave Mountain have been retained on Boxley Valley farms, although they were "completely destroyed" according to the official records of the First Iowa Cavalry (1/10/1863). Richland Valley bottomland yields bullets from the ambush sites of a Union munitions wagon train.

A variety of horse-drawing farming equipment has been acquired by the NPS from various river-bottom farms park-wide, and temporarily stored in a new building at BNR's Tyler Bend maintenance shop or left on-site as is the case at the former Clyde Villines farm (now NPS-owned) in Boxley Valley. A horse-drawn road grader (intact) was discovered in a thicket in Erbie in 1987 and has been placed in storage at Tyler Bend.

BNR is still awaiting a park-wide Cultural Landscape Inventory. The only BNR landscape that has had formal evaluation and listing as a cultural landscape is the Boxley rural historic landscape. The Erbie landscape was evaluated under limited criteria in 1986. While it was felt that the Erbie landscape lacked integrity as a whole, specific components, such as the Parker-Hickman farm and the Erbie Church, were significant enough to designate the area as a "historic zone." At present, BNR manages Rush, Buffalo River State Park, Parker-Hickman, Boxley, and Collier as landscapes. Fence lines, fields, foundations, roads, ruins, and standing buildings are within those landscapes.

Inventory and evaluation are still ongoing for historic resources within designated Wilderness and along many park trails. Until a final determination of National Register eligibility is made, resources are protected as if eligible.

Ethnographic Resources

Ethnography is concerned with contemporary peoples associated with the national river, with their cultural systems or ways of life, and with the related technology, sites, structures, other material features, and natural resources within its boundaries. These groups typically assign significance to places closely linked with their own sense of purpose, existence as a community, and development as ethnically distinctive peoples. Important places may support subsistence or ceremonial activities or represent birthplaces of significant individuals or group origin sites. Both culturally affiliated Native American tribes recognized by the federal government and white ethnic groups which have endured for two generations or more within the boundaries are considered traditional users. Ethnographic resources are subsistence and ceremonial locales and

sites, structures, objects, and rural landscapes assigned cultural significance by traditional users. Natural resources may have heritage significance in activities and beliefs related to, for example, religion, healing, and subsistence. Some peoples' religious beliefs also require quarrying certain minerals or collecting certain plants in specific places for sacred or medicinal purposes.

Attention to the peoples whose lifeways are traditionally associated with resources under National Park Service stewardship is mandated in legislation and NPS policies. According to the 1988 Management Policies (5:11):
Certain contemporary native American and other communities are permitted by law, regulation, or policy to pursue customary religious, subsistence, and other cultural uses of park resources with which they are traditionally associated. Such continuing use is often essential to the survival of family, community, or regional cultural systems, including patterns of belief and economic and religious life. Recognizing that its resource protection mandate affects this human use and cultural context of park resources, the National Park Service will plan and execute programs in ways that safeguard cultural and natural resources while reflecting informed concern for the contemporary peoples and cultures traditionally associated with them.

Ethnographic surveys or studies are not currently available for the park due to staffing and funding constraints. In 2000, the National Park Service contracted for a cultural affiliation study in order to determine which federally recognized Native American tribes are affiliated with Buffalo National River. The study is in draft form at this time. Ten tribes have been reported to be culturally affiliated with the park:
the Absentee Shawnee Tribe;
the Caddo Tribe of Oklahoma;
the Cherokee Nation of Oklahoma;
the Eastern Shawnee Tribe of Oklahoma;
the Osage Tribe of Oklahoma;
the Quapaw Tribe of Oklahoma,
the Shawnee Tribe;
the Tunica-Biloxi Tribe of Louisiana;
the United Keetoowah Band of the Cherokee Nation, and;
the Wichita and Affiliated Tribes.

Archeological evidence indicates that these tribes are likely to have lived in the area during prehistoric or historic times. The Osage claimed this area as their hunting territory when white explorers first entered what is now Arkansas and continued to use it as such until 1817 and possibly afterwards. From 1817 to 1828 the Buffalo River area was included in lands transferred by treaty to the Cherokee Nation. Local oral history for the upper part of the river, suggests that after 1828 some Native Americans continued to return to collect plants. Benge's route of the Trail of Tears crossed the Arkansas Ozarks just north of the park boundary; locally it is believed that individuals left the main party and hid along the river valley, some secretly remaining.

Through consultation, the ten affiliated tribes listed above have been invited to apprise Buffalo National River of ethnographic resources which have cultural and religious significance. A list of all plant and animal species present at Buffalo National River has been provided to the ten tribes

(consultation letters to the tribes, December 2002).All alternatives have the potential to affect previously unknown ethnographic resources.

3.10.2 *Environmental Consequences*

Impacts to cultural resources were assessed qualitatively by examining literature on the impact of wildland fires, prescribed fires, wildfire suppression, and thinning on cultural resources and by discussions with archeologists and cultural resource authorities.

Management and protection of cultural resources within the Federal Wildland Fire Management Program is a complex process (Gleeson and Jones, 2000). At present, Federal land managers, including the NPS, USFS, BIA, BLM and USFWS, are working jointly to develop a comprehensive management strategy and Programmatic Agreement (PA) that is consistent with Section 106 of the National Historic Preservation Act. The goal is to protect historic sites, structures, landscapes and traditional cultural sites while meeting fire management objectives.

The effects of fire on cultural resources are still not well understood or documented. To date, much of the literature on the subject is anecdotal and qualitative (Gleeson and Jones, 2000), rather than based on controlled scientific studies. For example, post-fire observations are often unable to distinguish between damage to archeological resources caused by the fire itself from damage that was pre-existing. Thus, the following discussion of potential impacts of fire and fire management on cultural resources is of necessity general and somewhat speculative.

Both wildland fires and wildland fire suppression can affect cultural resources and historic properties. Fires themselves can and often do destroy historic structures or properties, especially those constructed of wood or other flammable material. Historic districts and cultural landscapes are also somewhat vulnerable to adverse impacts or destruction from wildland fires.

The effects of fire on subsurface archeological resources and artifacts is a function of material, fire intensity, depth in soil, soil moisture, and depth of duff, among other factors. Hotter surface fires penetrate more deeply into the subsurface and can potentially cause more damage. Glass bottles can be cracked or broken for example. On the other hand, ceramics or objects carved or chipped from stone are likely to be more resistant to fire and heat. Since fires regularly swept across the Ozark landscape for centuries prior to the era of fire exclusion in the 20th century, for a subsurface historic object or archeological artifact to have survived into the 21st century, it is likely to have already withstood at least several and sometimes many previous fires.

Clearing fire lines associated with fire suppression can damage subsurface cultural and archeological resources by exposing, crushing, or removing them.

Damage to structures is a function of the amount of fuels around the structure. Structures standing above the ground surface, depending on their specific nature and composition, would presumably be more vulnerable to fire. BNR has standing structures dating to the early 1800s which survive to this date, suggesting that moderately severe fires have not disturbed BNR or Ozark landscape since that time. Most of BNR's objects and artifacts are found in connection with known home and community sites, both prehistoric and historic.

Buffalo National River's archeological and historic resources are limited and nonrenewable; many are fragile as well. When disturbed or removed from their context, the scientific information they could furnish is often lost forever. Precautions will be taken during fire suppression and prescribed fire activities in the park not to destroy or disturb important archeological and historic resources. While archeological and historic site surveys in the park are ongoing, they are still a long way from being completed.

It is recognized that prescribed fires may actually help in the location of archeological sites and artifacts through the removal of vegetation, and that BNR cultural resource managers have requested prescribed fires to be used to assist with surveys.

Fire management activities that disturb the ground in any way, such as fire line construction using hand tools or heavy equipment, will use paraprofessional and professional archeologists working in cooperation with firefighters and pre-burn preparation crews to prevent needless cultural resource destruction. During a wildland fire the highest priorities are safety and controlling the blaze; therefore, if the fire line cannot be diverted, cultural resources may have to be sacrificed. In most cases, however, damage can be averted.

Archeological and historic resources found within BNR are irreplaceable. Therefore these sites and structures must receive special attention. Guidelines from NPS-28 and other legal mandates will be followed to protect these resources from fire. Personnel taking part in suppression as well as prescribed burns will be briefed on the potential for disturbance of such resources. Any and all control actions undertaken will minimize the impact on such resources; wet line, foam and leaf blowers are the preferred minimum impact suppression techniques. No construction of hand lines will occur in connection with prescribed fire. For each of the three alternatives below, during fire suppression, prescribed fire, and rehabilitation activities, the following measures will be undertaken to help mitigate the impacts of fire suppression and rehabilitation on cultural resources:

1. General Measures for Protection and Mitigation

- Buildings, structures, ruins and sites (including fences and roads) need to be protected, depending on the situation, by:
  a) Pre-burn inventory of above-grade resources
  b) Hand cutting of fuel load, including perimeter clearings, which does not impact historic plantings or landscapes
  c) Wet or blown hand lines
  d) Foaming of buildings
  e) Wrapping buildings with fire resistant material
  f) Exclusion from prescribed burns

  Individual burn plans will identify the best methods.
- Post-burn assessments should identify and evaluate the effect of individual and repetitive fires on cultural resources.

- Cultural resource personnel must be consulted during the preparation of burn plans in order to assess the effect on cultural resources in burn areas.
    - Resource maps showing archeological and historic site locations will be given to archeologists and fire bosses on the fire lines.
    - When cultural resources are threatened by a fire, archeologists will be present to help mitigate the impacts of fire suppression and rehabilitation on cultural resources.
    - Priority will be given to monitoring heavy equipment, especially bulldozers and graders, through all aspects of the suppression and rehabilitation efforts.
    - Archeologists serving on a fire as technical specialists must hold a current red card and be equipped with appropriate standard firefighting safety equipment to perform their specific advisory duties on the fire line.
    - Special flagging will be used to identify archeological and historic sites.
    - A photographic record will be kept of all archeological materials uncovered during fire management and rehabilitation activities.
    - The Cultural Resource Management Specialist will coordinate all activities of line archeologists with fire bosses.

2. Archeological Sites – Buffalo National River has over 488 identified archeological sites scattered throughout the unit. The heat generated from a particularly hot fire can cause the fracturing of lithic materials lying on or close to the surface. To protect these sites, the following actions will be taken:

- The Prescribed Burn Boss (RxB1/2) or Incident Commander (IC), with assistance from the Park Archeologist, will identify all sites that may be, or have been affected by active fire.
- For wildland fires – The degree of heat penetration into the soil is the primary concern. A fire moving with a high rate of spread and not burning down to the soil will have little effect on lithics. However, if the fire is slow moving and is consuming all fuel to the mineral soil, the fire will be suppressed if firefighter safety will not be compromised.
    - For prescribed fire – If the prescription calls for removal of more than 50% of the ground litter, the site will be excluded from the burn or wetline, foam or other techniques will be used to exclude fire from the site.
    - The RxB1/2 or IC will not permit the use of digging handtools to construct fire line within any known site boundaries.
    - If fire has already burned over a site, the RxB1/2 or IC will alert the Park Archeologist or designee, who will examine the site for obvious lithics and possible impacts and submit a report for inclusion in the unit's main archeological file. The Park Archeologist will also make a determination as to whether an archeological evaluation is warranted.
    - The protection of sites will be done in such a manner as to not permit public disclosure.

If Native American human remains and/or objects are found during fire operations, the site will be evaluated by staff or regional archeologists in accordance with Sec. 3, Native American Grave Protection Resource Act (NAGPRA).

3. Historic – Buffalo National River has several historic zones and many historic structures. Historic and potentially historic structures are being evaluated for inclusion in the National Register of Historic Places and the List of Classified Structures (LCS). Until the LCS is finalized, the following guidelines will be followed:

- All structures will be protected from fire until the LCS is completed.
- Once the LCS is finalized, those structures identified as having historic significance will be protected from all fires.
- Once the LCS is finalized, those structures not having historic significance will become discovery sites. These sites will be protected from all fires.

In addition, fire management staff will keep BNR's Cultural Resource Management Specialist informed as to upcoming prescribed fire and suppression activities. BNR's fire management staff will hold pre-burn meetings with all park cultural professionals prior to all prescribed fire activities to discuss what resources are in the proposed burn area and protective measures. The park superintendent, through his or her designee (BNR's Section 106 coordinator), in turn, will inform and consult with the Arkansas SHPO, the Native American tribes which are culturally affiliated with BNR, and if necessary, the Advisory Council on Historic Preservation (ACHP), on forthcoming projects and activities, such as prescribed burns for hazard fuel reduction in the vicinity of historic properties, to ensure compliance with Section 106 of the NHPA.

3.10.2.1 Alternative 1 – No Action

Proposed activities with the potential to impact cultural resources include building fire lines, thinning, and prescribed fire.

Known cultural sites that could be potentially affected during thinning, fire line construction and slash piling would be avoided to eliminate potential damage. Site boundaries would be clearly marked for avoidance, and sites would be monitored during and after completion of the activities. Because these sites would be avoided, there would be no effect to these cultural resource sites.

Sites with combustible materials (i.e. exposed wood) that cannot be avoided during prescribed fires would be covered with fire resistant foam or shelter material. If needed, a fire line would be built around the perimeter of these sites. Fuels would be removed from the interior of the sites and from the area surrounding the site to maintain low burn temperatures. Back burning may also take place around the site to reduce fuel loading. Low temperature burning over chipped stone scatters does not require additional protective measures. Low temperature burning is considered to have no adverse effect

on these cultural resource sites. In general, prescribed fires will be a lot less intense than wildland fires, and thus have less potential for damage.

There would be the potential for fire suppression activities to affect unrecorded cultural resources within BNR.

3.10.2.2 Alternative 2 – Preferred Alternative

General impacts to cultural resource sites under Alternative 2 would be similar to those described under the No Action Alternative.

3.10.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

Proposed activities with the potential to impact cultural resources include building fire lines and thinning. Impacts to cultural resource sites from these activities are similar to those described under the No Action Alternative. As with the other action alternatives, there would be the potential for fire management activities affecting unrecorded cultural resource sites.

Conclusion

The implementation of any of the alternatives would not significantly impact, and thus impair, cultural resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of BNR, (2) key to the natural or cultural BNR, and (3) identified as a goal in BNR's general management plan or other Park Service planning documents.

3.11 WILDERNESS

3.11.1 *Affected Environment*

Wilderness is defined in the 1964 Wilderness Act (P.L. 88-577) as a place where natural forces, not human ones, predominate. It is "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."

Public Law 95-625, dated November 10, 1978, established the Buffalo National River Wilderness Area in three separate units (BNR, no date). The Upper Buffalo Wilderness, consisting of 2,200 acres, is at the westernmost end of the Buffalo **National River and the Lower Buffalo Wilderness, 22,500 acres is at the easternmost end. Ponca Wilderness begins approximately seven miles to the northeast of the Upper Buffalo Wilderness Area.**

When Congress created the Buffalo National River Wilderness Area, it designated 10,529 acres as Wilderness and identified an additional 25,471 acres as potential wilderness additions. Since that time all but 1,007 acres of these acres have come under wilderness designation. Most of the remaining potential additions are divided between nine separate

parcels in the three units of the BNR Wilderness Area. Most of these are use and occupancy reservation that will expire by the year 2005. The only exception is a 180-acre parcel owned by the Boy Scouts of America within the boundaries of the Ponca Unit. This undeveloped land is part of Camp Orr, one of three private use zones designated legislatively. The National Park Service acquired a scenic easement on Camp Orr in 1984 to prevent incompatible development.

The Upper Buffalo Wilderness Unit adjoins the Upper Buffalo Wilderness Area administered by the U.S. Forest Service. Recreational use is limited by the high skill level required to run this section of the river, by limited access, and by the absence of maintained trails.

The Ponca Wilderness Unit has the most recreational use of any wilderness area in Arkansas. Access is facilitated by paved highways on its perimeter, by an extensive trail system and by high levels of seasonal river use. Feral pigs pose a significant environmental threat in this wilderness area.

The Lower Buffalo Wilderness Unit encircles the lower river and adjoins the USFS Leatherwood Wilderness Area. The river channel is not included in this wilderness unit to allow for continued use of motorized boats. The area also has numerous traditional hunting camps established during deer and turkey season. The last 2-3 miles of the Buffalo are used extensively by anglers. As at Ponca, feral pigs are also a problem in Lower Buffalo.

With regard to fire management in designated wilderness areas, NPS policy stipulates that:

> Fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. The park's fire management and wilderness management plans must identify and reconcile the natural and historic roles of fire in the wilderness, and will provide a prescription for response, if any, to natural and human-caused wildfires. If a prescribed fire program is implemented, these plans will also include the prescriptions and procedures under which the program will be conducted within wilderness.
>
> Actions taken to suppress wildfires will use the minimum requirement concept [aka "MIST", see next paragraph], and will be conducted in such as way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions (NPS, 2001; Section 6.3.9).

At present, due to the relatively small size of the wilderness units and the extent of development within their boundaries, BNR's *Wilderness and Backcountry Management Plan* calls for suppression of all wildfires, whether caused by lightning or humans (BNR, no date). Suppression activities are to be planned and implemented in accordance with the principles of Minimum Impact Suppression Tactics (MIST) so as to minimize environmental impact.

3.11.2 *Environmental Consequences*

Impacts to wilderness were evaluated qualitatively by examining the letter and spirit of the 1964 Wilderness Act and NPS policies, consulting with wilderness authorities, making comparisons with fire management in other wilderness areas, and professional judgment and experience.

3.11.2.1 Alternative 1 – No Action

This alternative will have negligible to minor adverse effects on designated Wilderness within the park. Under Alternative 1, these areas will retain their "primeval character," will receive no additional permanent improvements or human habitation, and will still appear "to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" (Section 2(c), Wilderness Act).

Fire is a natural force, and thus neither Wildland Fire Use nor occasional prescribed fires are deemed by Federal land managers as being inherently incompatible with wilderness character and values; indeed, they are encouraged. However, as mentioned above, in order to conduct prescribed fires within the designated Wilderness areas, the park's Wilderness Management Plan must address the prescriptions and procedures under which the program will be conducted within the wilderness. BNR's plan specifically prohibits wildland fire use within the three designated Wilderness units but does not rule out prescribed fire, stating instead that studies of fire history in the park's backcountry may "indicate the need to utilize prescribed fire to maintain or restore native plant communities." By using prescribed fires, and helping to restore some semblance of the historic fire regime in BNR's vegetation communities, this alternative is in accordance with the letter and spirit of the Wilderness Act and NPS policy directives.

Under this and every other alternative, suppression actions to control wildfires may take place in the designated Wilderness. The park must weigh values at risk, including human life, nearby improvements, wilderness values, habitat and wildlife values. Per Director's Order #41 on Wilderness Preservation and Management (NPS, 1999), each alternative will require the use of hand tools and MIST within areas of designated Wilderness so as to minimize the effect of temporary human disturbances and intrusions.

Noise and general disturbance associated with both prescribed fire and fire suppression activity will probably last no more than a few days or weeks per decade, more or less. This will not constitute a significant impact on the sense of solitude that wilderness areas are supposed to engender in their users.

3.11.2.2 Alternative 2 – Preferred Alternative

General impacts to cultural resource sites under Alternative 2 would be similar to those described under the Preferred Alternative.

3.11.2.3 Alternative 3 – Wildland Fire Suppression and No Prescribed Fires

As stated above, BNR's current *Wilderness and Backcountry Management Plan* specifically mandates suppression actions to control wildland fires in the park's designated

Wilderness Areas. Director's Order #41 requires the use of MIST within areas of designated Wilderness so as to minimize the effect of temporary human disturbances and intrusions; this may include hand tools as minimum tools or in emergencies.

Over the long term, Alternative 3 will have minor adverse effects on designated Wilderness within BNR. This alternative will retain certain wilderness values – such as the appearance of wildness at most times and the absence of improvements and human inhabitants. Yet by actively excluding a critical natural force that shapes habitats and the landscape, Alternative 3 may be violating the spirit if not the letter of the Wilderness Act. In addition, the greater level of suppression activity that will occur under this alternative runs the risk of minor interference both with the solitude and appearance of wilderness. If extreme weather conditions eventually trigger a large wildfire in the park, the short-term impact of both the fire on the landscape and intensive suppression activities on the integrity of the wilderness could be substantial.

3.12 CUMULATIVE EFFECTS

The cumulative effects analysis for the Fire Management Plan environmental assessment considers the past, present, and reasonably foreseeable future actions on land uses that could add to (intensify) or offset (compensate for) the effects on the resources and that may be affected by the fire Management Plan alternatives. Cumulative effects vary by resource and the geographic areas considered here are generally BNR and areas adjacent to BNR. In some instances, activities may result in both negative and positive impacts when considering the short and long-terms. As a result, some resource categories in Table 3-1 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-1 is the basis for the cumulative effects described in Table 3-2.

Table 3-1 Affected Impact Topics and Activities/Land Uses Contributing to Buffalo National River Fire Management Plan Implementation Cumulative Effects

Activity or Action	Geology & Soils	Water Resources	Flood-plains & Wetlands	Vege-tation	Wildlife	T & E Species	Air Quality	Visitor Use & Experience	Human Health & Safety	Cultural Resources	Wilderness
Resource extraction and agriculture outside park within Buffalo R. watershed	-	-	-		-						-
Past prescribed fires and thinning on the park	+ -	+ -		+ -	+ -	+ -	-	+ -	+ -	+ -	+ -
Lightning & human-caused wildfires	+ -	+ -	-	+ -	+ -	+ -	-	+ -	+ -	+ -	+ -
Wildfire suppression past, present, future	-	+ -	+ -	-	-	-	+	+ -	+	+ -	+ -
Hunting and fishing					+ -						
Visitation to the park								+		-	-

DIRECT/INDIRECT EFFECTS KEY: (+) Positive/beneficial; (-) Negative/detrimental; (Blank) Neutral/no effect

Table 3-2 Cumulative Effects

Resource	Past and Present Actions	Proposed Actions	Future Actions	Cumulative Effects
Geology & Soils	Adverse soil impacts (soil erosion or loss) from past timber practices, road building, agriculture, and mineral extraction in surrounding areas, past willdland fires and suppression efforts; beneficial soil impacts from past wildland fires (nitrification of soils)	Prescribed fire, thinning and wildlland fire suppression activities would have temporary and minor adverse effects on soils (soil erosion), but beneficial effects as well over the short and long-terms (soil development and soil nitrification)	Adverse soil impacts (soil erosion or loss) would continue from timber practices, road building, agriculture mineral extraction and residential development in surrounding areas, past willdland fires and suppression efforts; beneficial soil impacts from past wildland fires (nitrification of soils)	Soils inside of the park would improve over time with soil development and nitrification from prescribed fires; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to positive soil cumulative impacts, while Alternative 3 would contribute the least
Water Resources	Buffalo River hydrology (water quality and quantity) altered by logging, agriculture, and road building adjacent to the park (within watershed	Thinning, prescribed fire, and wildland fire suppression activities would have minor impacts on surface waters	Buffalo River hydrology (water quality and quantity) altered by logging, agriculture, and road building adjacent to the park (within watershed	Minor effect on water resources; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to positive water resource cumulative impacts, while Alternative 3 would contribute the least in most years, but the most in years of catastrophic fires
Floodplains and Wetlands	Buffalo River floodplain subject to greater flooding from upstream human activities, past and present, within watershed; this and development within floodplain exposes more people and structures to risk of flooding and damage	Thinning, prescribed fire, and wildland fire suppression activities would have very minor impacts on surface waters	Buffalo River floodplain would continue to be subjected to greater flooding from upstream human activities within watershed; this and development within floodplain exposes more people and structures to risk of flooding and damage	Buffalo River floodplain subject to greater flooding from upstream human activities within watershed; this and development within floodplain exposes more people and structures to risk of flooding and damage. FMP would not result in significant cumulative impacts
Vegetation	Natural fuel loading increased in absence of historic low-severity, high-frequency fire regime over most of 20th century; vegetation community composition and structure altered; native plant habitat and diversity declined; increased infestation of noxious weeds;	Thinning and prescribed fire would reduce hazardous fuel loadings; native fire-adapted and fire-dependent grass and forb species would be favored; forest stand structure in some areas would return to approximate historic conditions	Future noxious weeds treatments would continue to control their spread; future climate change may lead to shift in precipitation patterns and rising temperatures, thus shifting biomes to the north; future impacts from insect infestations may contribute to increased hazard fuel loads	Fuel loadings would pose a reduced fire danger; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to positive vegetation cumulative impacts, while Alternative 3 would contribute the least

Table 3-2 Cumulative Effects

Resource	Past and Present Actions	Proposed Actions	Future Actions	Cumulative Effects
Wildlife	Fire suppression efforts within the park, timbering activities and agricultural practices on adjacent National Forest and private lands have generally degraded wildlife habitat and diversity, with some exceptions	Thinning and prescribed fire would result in minor, short-term disturbance and displacement with minimal loss of wildlife; improved habitat and increased wildlife diversity with restoration of approximate historic fire regime	Future noxious weeds treatments would continue to control their spread and improve wildlife habitat; future climate change may lead to shift in precipitation patterns and rising temperatures, thus shifting biomes, and wildlife habitats, to the north	Wildlife habitat and diversity increases; Fire Management Plan does not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to wildlife cumulative impacts (largely beneficial), while Alternative 3 would contribute the least
Threatened and Endangered Species	Fire suppression efforts within the park, timbering activities and agricultural practices on adjacent National Forest and private lands have generally degraded habitat for Threatened and Endangered species	Thinning and prescribed fire would result in minor, short-term disturbance and displacement with minimal losses to listed species of plants and animals; somewhat improved habitat for T & E species in general with restoration of approximate historic fire regime	Future noxious weeds treatments would continue to control their spread and improve wildlife habitat in general, and T & E habitat in particular; future climate change may lead to shift in precipitation patterns and rising temperatures, thus shifting biomes, and wildlife habitats, including those of some T & E species, to the north	Wildlife habitat and diversity increases; Fire Management Plan does not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to wildlife cumulative impacts (largely beneficial), while Alternative 3 would contribute the least
Air Quality	Industry and agricultural practices emit pollutants and particulate matter; automobiles, past wildland and prescribed fires contribute to some temporary deterioration in air quality and visibility	Prescribed fire emissions would result in minor, short-term air quality and visibility impacts	Future wildland fires would contribute to temporary deterioration in air quality and visibility	Class II air quality standards would not be violated; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to negative air quality cumulative impacts, while Alternative 3 would contribute the least (in most years)
Visitor Use and Experience (including Park Operations)	Establishment of the park, improved roads and trails provided access for recreation opportunities; increased population growth results in increased recreational use and some crowding during summer months	Minor visitor use and experience impacts resulting from thinning and prescribed fire	Increased recreation use from national population growth, rising long-term national interest in outdoor recreation, and possible further development of tourist destination opportunities in the region	Long-term enhancement of recreation resources and opportunities offsets short-term recreation inconveniences from fuel treatments, closures, and smoke; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to visitor use and experience cumulative impacts, while Alternative 3 would contribute the least

Table 3-2 Cumulative Effects

Resource	Past and Present Actions	Proposed Actions	Future Actions	Cumulative Effects
Human Health & Safety	Past suppression efforts protected park staff and visitors	Thinning and prescribed fire might result in very minor impacts; long-term improvement in human health & safety with reduction in fuels	Similar effects as described in Past and Present Actions	Human health and safety would improve over time with thinning and prescribed fire activities; Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to human health and safety cumulative impacts, while Alternative 3 would contribute the least
Cultural Resources	Establishment of the park helped protect cultural resources; past suppression efforts may have impacted un-recorded sites	Fuel treatments could result in impacts to undiscovered sites; pre-treatment surveys may reveal resources and allow for mitigation of impacts from thinning, prescribed fire, and wildland fire suppression	Similar effects as described in Past and Present Actions	Cultural resources continue to be discovered and protected; Fire Management Plan would not result in significant cumulative impacts; the No Action and Proposed Action Alternatives would contribute the most to cultural r Esources cumulative impacts, while Alternative 3 would contribute the least
Wilderness	Wilderness lost in Ozarks in 19th century as Euro-American settlers migrated to region, altered landscape on a vast scale and decimated wildlife; BUFF and contiguous Ozark National Forest establishment of Wilderness areas helps restore wilderness character to vestiges of formerly wild country; increased human population and activities in region during 20th century compromised wild character of country	Thinning and prescribed fire might result in minor temporary and short-term adverse impacts to Wilderness values; suppression activities using MIST will also result in temporary and short-term effects	Biome shifts in response to climate change and potential rise in visitation would affect Wilderness character	Long-term enhancement of vegetation and wildlife resources within wilderness areas offsets temporary and short-term encroachments on wilderness quality from suppression and prescribed fire activities and associated noise and heavy human presence. Fire Management Plan would not result in significant cumulative impacts; the No Action and Preferred Alternatives (1,2) would contribute the most to cumulative impacts on Wilderness (generally beneficially), while Alternative 3 would contribute the least

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TBD

Scoping

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.5 – *Scoping Issues and Impact Topics*.

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Appendices

APPENDIX A

ACRONYMS AND ABBREVIATIONS

AA	Antiquities Act
ACHP	Advisory Council on Historic Preservation
AFC	Arkansas Forestry Commission
AGFC	Arkansas Game and Fish Commission
ARPA	Archaeological Resources Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BNR	Buffalo National River
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEA	Draft Environmental Assessment
DOD	Department of Defense
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FMP	Fire Management Plan
FMU	Fire Management Unit
FMA	Fire Management Area
FONSI	Finding of No Significant Impact
FR	Federal Register
FY	Fiscal Year
GMP	General Management Plan
HSA	Historic Sites Act
IMPROVE	Interagency Monitoring of Protected Visual Environments
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	Miles Per Hour
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAST	National Assessment Synthesis Team
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PA	Programmatic Agreement
P.L.	Public Law
PM	Particulate Matter
PM_{10}	Particulate Matter smaller than 10 microns in diameter
$PM_{2.5}$	Particulate Matter smaller than 2.5 microns in diameter
POL	Petroleum, Oils, and Lubricants
RCRA	Resource Conservation and Recovery Act
RMP	Resources Management Plan

SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMP	Smoke Management Plan
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
TNC	The Nature Conservancy
T&E	Threatened and Endangered
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USFS	United States Forest Service
USNVC	United States National Vegetation Classification
USFWS	United States Fish and Wildlife Service
VERP	Visitor Experience and Resource Protection
WFU	Wildland Fire Use (for resource benefit)

APPENDIX B

GLOSSARY

Air Quality: The characteristics of the ambient air (all locations accessible to the general public) as indicated by concentrations of the six air pollutants for which national standards have been established, and by measurement of visibility in mandatory Federal Class I areas.

Alluvium: Material transported and deposited on land by flowing water, such as clay, silt, and sand.

Ambient Air: Any unconfined portion of the atmosphere; open air, surrounding air.

Ambient Air Quality Standards: Standards established on a State or Federal level that define the limits for airborne concentrations of designated "criteria" pollutants (e.g., nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter, ozone, lead) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Appropriate Management Response: Specific actions taken in response to a wildland fire to implement protection and fire use objectives. This term is a new term that does not replace any previously used term.

Archaeology: The scientific study, interpretation, and reconstruction of past human cultures from an anthropological perspective based on the investigation of surviving physical evidence of human activity and the reconstruction of related past environments.

Archaeological Resources: Any material of human life or activities that is at least 100 years old, and that is of archaeological interest.

Attainment Area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others. Attainment areas are defined using pollutant limits set by USEPA.

Best Management Practice (BMP): A practice or combination of practices chosen as the most effective, economical, and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with State and local water quality goals. Selection of appropriate BMPs depends largely upon the conditions of the site, such as land use, topography, slope, water table elevation, and geology.

Climax: A biotic community that is in equilibrium with existing environmental conditions and represents the terminal stage of an ecological succession.

Combustion: Burning. Many important pollutants, such as sulfur dioxide, nitrogen oxides, and particulates (PM-10) are combustion products, often products of the burning of fuels such as coal, oil, gas and wood

Coniferous: Cone-bearing tree. Examples are pines, firs, spruces, hemlocks, and cedars.

Class I Area: An area set aside under the Clean Air Act (CAA) to receive the most stringent protection from air quality degradation. Mandatory Class I Federal areas are: (1) international parks, (2) national wilderness areas which exceed 5,000 acres in size, (3) national memorial parks which exceed 5,000 acres in size, and (4) national parks which exceed 6,000 acres and were in existence prior to the 1977 CAA Amendments. The extent of a mandatory Class I Federal area includes subsequent changes in boundaries, such as park expansions.

Criteria air pollutants: A group of y common air pollutants regulated by EPA on the basis of criteria (information on health and/or environmental effects of pollution) and for which NAAQS have been established. In general, criteria air pollutants are widely distributed over the country. They are: particulate matter (PM), carbon monoxide(CO), sulfur dioxide(SO_2), ozone(0_3), and lead.

Crown Fire: Fire that burns in the crowns of trees and shrubs. Usually ignited by a surface fire. Crown fires are common in coniferous forests and chaparral-type shrublands.

Cultural Landscape: A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general kinds of cultural landscapes, not mutually exclusive: historic sites, historic designed landscape, historic vernacular landscape, and ethnographic landscape.

Cultural Resources: Any building, site, district, structure, object, data, or other material significant in history, architecture, archeology, or culture. Cultural resources include: historic properties as defined in the National Historic Preservation Act (NHPA), cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA), archeological resources as defined in the Archeological Resources Protection Act (ARPA), sacred sites as defined in Executive Order 13007, *Protection and Accommodation of Access To "Indian Sacred Sites,"* to which access is provided under the American Indian Religious Freedom Act (AIRFA), and collections.

Cumulative Impacts: Impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (Federal or non-Federal) or person undertakes such other actions; effects resulting from individually minor, but collectively significant, actions taking place over a period of time.

Deciduous: Shedding leaves annually. Deciduous trees tend to be broad-leafed, such as oaks, maples, birches, and aspens. However, the larch, which is a needle-bearing, coniferous tree, is also deciduous.

Demography: The statistical science dealing with the distribution, density, vital statistics, etc. of populations.

Ecosystem: An interacting system of interdependent organisms.

Ecotone: Zone of transition from one ecosystem, plant community or habitat to another.

Endangered Species: A species of plant or animal that is in danger of extinction throughout all or a significant portion of its range.

Ethnography: Part of the discipline of cultural anthropology concerned with the systematic description and analysis of cultural systems or lifeways, such as hunting, agriculture, fishing, other food procurement strategies, family life festivals and other religious celebrations.

Eutrophic: Nutrient-rich waters in pond, lake or river; frequently productive, sometimes low in dissolved oxygen.

Federal Land Manager (FLM): With respect to any lands in the United States, the Secretary of the Federal department with authority over such lands. Generally, the Secretaries delegate their authority to specific elements within each department. For example, the National Park Service and the Fish and Wildlife Service manage those areas under the authority of the Department of the Interior.

Fire Exclusion: The policy of suppressing all wildland fires in an area (Smith 2000).

Fire Frequency = Fire Occurrence: Number of fires per unit time in a specified area (McPherson and others 1990).

Fire Intensity: A general term relating to the heat energy released in a fire. FEIS usually uses more specific terms to describe rate of heat release. See FIRELINE INTENSITY below.

Fire Interval: Time (in years) between two successive fires in a designated area (i.e., the interval between two successive fire occurrences); the size of the area must be clearly specified (McPherson and others 1990).

Fire Management Plan (FMP): A strategic plan that defines a program to manage wildland and prescribed fires, and documents the FMP to meet management objectives outlined in the approved resource management plan. The plan is supplemented by operational procedures such as preparedness plans, burn plans and prevention plans.

Fire Management Unit (FMU): Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMU's are delineated in FMP's. These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire-Dependent Ecosystem: A community of plants and animals that must experience recurring disturbances by fire in order to sustain its natural plant succession, structure and

composition of vegetation, and maintain appropriate fuel loading and nutrient cycling to ensure proper ecosystem function.

Fire Use: The combination of wildland fire use and prescribed fire application to meet resource objectives.

Fuel: Fuel is comprised of living and dead vegetation that can be ignited. It is often classified as dead or alive and as natural fuels or activity fuels (resulting from human actions, usually from logging operations). Fuel components refer to such items as downed dead woody material by various size classes, litter, duff, herbaceous vegetation, and live foliage.

Fugitive Dust: Particulate matter composed of soil, uncontaminated from pollutants, resulting from industrial activity. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either moved or redistributed.

General Management Plan (GMP): A document that sets forth a basic management philosophy and a framework for decision-making for each unit of the National Park System, such as Buffalo National River, for a period of 15-20 years. At present, BUFF does not have a GMP, and is operating under a Final Master Plan approved in February, 1977.

Geological Formation: Layers of rock, deposited in the same geological age and forming a distinctive unit.

Ground Fire: Fire that burns in the organic material below the litter layer, mostly by smoldering combustion. Fires in duff, peat, dead moss and lichens, and punky wood are typically ground fires (Brown 2000).

Groundwater: Water in the porous rocks and soils of the earth's crust; a large proportion of the total supply of fresh water.

Hardwoods: Broad-leaf trees that are usually deciduous and tend to have harder wood than conifers. Includes oaks, maples, hickories, ashes, birches, aspens, and poplars.

Hazard Fuel: A fuel complex that, by nature, presents a hazard to socio-politico-economic interests when ignited. The hazard fuel condition can be mitigated through hazard fuel reduction.

Hazardous fuels: Those vegetative fuels which, when ignited, threaten: public safety, structures and facilities, cultural resources, natural resources, and/or natural processes. Also: fuels that permit the spread of wildland fires across administrative boundaries except as authorized by agreement, and fuel accumulations and arrangement may be within the natural range of variability and still be hazardous because of the proximity to values at risk.

Hazardous Materials: Solid or liquid materials which may cause or contribute to mortality or serious illness by virtue of physical and chemical characteristics, or pose a hazard to human health or the environment when improperly managed, disposed of, treated, stored, or transported.

Hazardous Waste: A waste or combination of wastes which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Haze: An atmospheric aerosol of sufficient concentration to be visible. The particles are too small to see individually, but reduce visual range by scattering light.

Historic District: a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, landscapes, structures, or objects, united by past events or aesthetically by plan or physical developments.

Historic Property: As defined by the NHPA, a historic property or historic resource is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including any artifacts, records, and remains that are related to and located in such properties. The term also includes properties of traditional religious and cultural importance (traditional cultural properties), which are eligible for inclusion in the NRHP as a result of their association with the cultural practices or beliefs of an Indian tribe or Native Hawaiian organization.

Intermittent Stream: A stream that flows only at certain times of the year when it receives water from rainfall, surface runoff, or springs.

Interpretation: A communication process designed to reveal meanings and relationships of cultural and natural heritage to the public through first-hand experiences with objects, artifacts, landscapes or sites; facilitating a connection between the interests of the visitor and the meaning of the park by explaining the park's purpose and significance; usually a single contact with a group or individual.

Inversion*:* A layer in the atmosphere where the temperature increases with altitude.

Land Use Plan: A broad scale, long range plan (e.g., forest plan, refuge plan or resource management plan) that identifies the scope of actions and goals for the land and resources administered by a land owner/manager.

Ladder Fuels: Shrubs and young trees that provide continuous fine material from the forest floor into the crowns of dominant trees.

Litter: The top layer of the forest floor (01 soil horizon); includes freshly fallen leaves, needles, fine twigs, bark flakes, fruits, matted dead grass and other vegetative parts that are little altered by decomposition. Litter also accumulates beneath rangeland shrubs. Some surface feather moss and lichens are considered to be litter because their moisture response is similar to that of dead fine fuel.

Loam: A soil material which contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Mast: Fruits of all flowering plants used by wildlife, including fruits with fleshy exteriors (such as berries) and fruits with dry or hard exteriors (such as nuts and cones).

Minimum Impact Suppression Tactics (MIST):

Mitigation: A method or action to reduce or eliminate adverse program impacts.

Mobile sources: Moving objects that release pollution; mobile sources include cars, trucks, buses, planes, trains, motorcycles and gasoline-powered lawn mowers. Mobile sources are divided into two groups: road vehicles, which include cars, trucks and buses, and non-road vehicles that include trains, planes and lawn mowers.

Monitoring (monitor): Systematically observing, recording, or measuring some environmental attribute, such as air quality or water quality, or ascertaining compliance with a given law, regulation, or standard. For example, measurement of air pollution is referred to as monitoring. EPA, state and local agencies measure the types and amounts of pollutants in the ambient air. The 1990 Clean Air Act requires certain large polluters to perform enhanced monitoring to provide an accurate picture of how much pollution is being released into the air. The 1990 Clean Air Act requires states to monitor community air in polluted areas to check on whether the areas are being cleaned up according to schedules set out in the law.

National Environmental Policy Act (NEPA): Establishes procedures that Federal agencies must follow in making decisions on Federal actions that may impact the environment. Procedures include evaluation of environmental effects of proposed actions, and alternatives to proposed actions, involvement of the public and cooperating agencies.

National Ambient Air Quality Standards (NAAQS): Standards for maximum acceptable concentrations of "criteria" pollutants in the ambient air to protect public health with an adequate margin of safety (primary standard), and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, materials damage, etc.) in the ambient air (secondary standard).

National Fire Danger Rating System (NFDRS): A widely-used system to predict several measures of fire probability and resistance to control.

National Historic Landmark (NHL): A special type of historic property designated because of its national importance in American history, architecture, archaeology, engineering, or culture. Section 800.10 of the Advisory Council on Historic Preservation's regulations (36 CRF 800), as well as Section 110(f) of the National Historic Preservation Act, specify special protections for NHLs.

Natural Fire: Fires ignited by natural means (usually lighting).

Natural Resources: Phenomena that occur in their natural state - wildlife, fisheries, water, forests, air, soils, minerals, etc.

Nonattainment Area: A geographic area that has been designated by the U.S. Environmental Protection Agency and the appropriate state air quality agency as exceeding one or more National Ambient Air Quality Standards. It has been estimated that 60% of Americans live in nonattainment areas.

Nonpoint Source: A source of pollution that is inherently diffuse or dispersed, such as land runoff, precipitation, atmospheric deposition, or percolation.

Nuisance Smoke: Amounts of smoke in the ambient air that interfere with a right or privilege common to members of the public, including the use or enjoyment of public or private resources.

Organic Soils: Deep layers of organic matter that develop in poorly drained areas such as bogs, swamps, and marshes.

Ozone: A gas that is a variety of oxygen. Ozone consists of three oxygen atoms stuck together into an ozone molecule. Ozone occurs in nature; it produces the pungent odor smelled near a lightning strike. High concentrations of ozone occur in a layer of the atmosphere -- the stratosphere -- high above the Earth. Stratospheric ozone shields the Earth from harmful rays from the sun, particularly ultraviolet B. Smog's main component is ozone; this ground-level or tropospheric ozone is a product of reactions among chemicals produced by burning coal, gasoline and other fuels, and chemicals found in products including solvents, paints, hair sprays, etc.

Parent Material: Disintegrated and partly weathered rock from which soils are formed.

Particulate Matter (PM): A mixture of very small particles that are suspended in the atmosphere, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., dust, smoke, mist, fumes, or smog).

PM_{10}: Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (including $PM_{2.5}$). Concentrations in the air are measured as micrograms per cubic meter of air (ug/m3).

$PM_{2.5}$: Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. Concentrations in the air are measured as micrograms per cubic meter of air (ug/m3).

Perennial Stream: A stream that flows throughout the year.

Prescribed Fire: Any fire ignited by management actions to meet specific objectives (i.e., managed to achieve resource benefits).

Prescription: Measurable criteria that guide selection of appropriate management response and actions. Prescription criteria may include the meteorological conditions affecting the area under prescription, as well as factors related to the state of the area to be burned such as the fuel

moisture condition and other physical parameters. Other criteria which may be considered include safety, economic, public health, environmental, geographic, administrative, social or legal considerations, and ecological and land use objectives.

Preservation: The act or process of applying measures necessary to sustain the existing form, integrity and materials of a historic structure, landscape, or object; generally is ongoing in nature involving repairs rather than extensive replacement and new work.

Proposed Wilderness: land recommended for designation as wilderness by Congress, based on a wilderness study submitted by a park or region, but which has not been approved by the Department and subsequently transmitted to Congress by the President; managed so as to not diminish wilderness characteristics.

Regional Haze: Generally, concentrations of fine particles in the atmosphere extending hundreds of miles across a region and causing deteriorated visibility conditions; wide-spread visibility impairment, especially in mandatory Class I Federal areas where visibility is an important value.

Resource Management Plan (RMP): A document prepared for a given unit of the National Park System, such as Buffalo National River, that sets forth goals, issues and strategies for the management, conservation and protection of natural and cultural resources at that unit.

Runoff: Non-infiltrating water entering a stream or other conveyance channel during and shortly after a rainfall.

Scoping: Planning process that solicits people's and "stakeholders'" opinions on the value of a park, issues facing a park, and the future of a park. Also used in the NEPA process at the outset of preparing an EA or an EIS to help determine the scope of the study and the major issues that merit investigation and analysis.

Sensitive Populations: Those populations to whom smoke may present particular health risks

Sensitive Receptors: Locations where human population tend to concentrate and where smoke could impact the health of those population or significantly impact visibility that may be detrimental to either health or the enjoyment of scenic qualities of the landscape. These may be residential concentrations in the form of towns or cities, or locations where people tend gather in groups such as parks. Travel routes such as highways may be labeled as sensitive receptor sites where smoke can be a factor in potential motor vehicle accidents. Particular areas along highways or other locations may be more prone to being declared sensitive receptor sites because of topographic and microclimate features.

Silt: Fine sediment suspended in stagnant water or carried by moving water; it often accumulates on the bottom of streams and rivers.

Smoke Management Program: Establishes a basic framework of procedures and requirements for managing smoke from fires that are managed for resource benefits. The purposes of SMP's

are to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with the regional haze rules.

Soil Association: A landscape, named for its major soil types, that has a distinctive proportional pattern of soils, generally consisting of one or more major soils and at least one minor soil type.

Soil Erosion: The removal and loss of soil by the action of water, ice, gravity, or wind.

Source: Any place or object from which pollutants are released. A source can be a power plant, factory, dry cleaning business, gas station or farm. Cars, trucks and other motor vehicles are sources, and consumer products and machines used in industry can be sources too. Sources that stay in one place are referred to as stationary sources; sources that move around, such as cars or planes, are called mobile sources.

State Historic Preservation Officer (SHPO): The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the NHPA.

State Implementation Plan (SIP): A detailed description of the programs a state will use to carry out its responsibilities under the *Clean Air Act*. State implementation plans are collections of the regulations and emission reduction measures used by a state to reduce air pollution in order to attain and maintain NAAQS or to meet other requirements of the Act. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Stationary Source: A place or object from which *pollutants* are released and which does not move around. Stationary sources include power plants, gas stations, incinerators, etc.

Succession: The gradual, somewhat predictable process of community change and replacement leading toward a climax community; the process of continuous colonization and extinction of populations at a particular site.

Suppression: A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Threatened Species: A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Violation of the PM NAAQS: As revised in 1997, the daily PM_{10} standard is violated when the 99th percentile of the distribution of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds 150 $\mu g/m^3$ at any monitor within an area. The annual PM_{10} standard is violated when the arithmetic average of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds 50 $\mu g/m^3$ at any monitor within an area. For PM2.5the daily standard is violated when the 98th percentile of the distribution of the 24-hour concentrations for

a period of 1 year (averaged over 3 calendar years) exceeds 65 $\mu g/m^3$ at any monitor within an area. The annual standard is violated when the annual arithmetic mean of the 24-hour concentrations from a network of one or more population-oriented monitors (averaged over 3 calendar years) exceeds 15 $\mu g/m^3$.

Visit: One person visiting a site or area for recreation purposes for any period of time.

Visitor Destination: Point of interest in the park established for day use visitation.

Volatile Organic Compounds (VOC's): Any organic compound that participates in atmospheric photochemical reactions. Some compounds are specifically listed as exempt due to their having negligible photochemical reactivity. [See 40 CFR 51.100.] Photochemical reactions of VOC's with oxides of nitrogen and sulfur can produce O_3 and PM.

Wetlands: Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil, including swamps, marshes, bogs, and other similar areas.

Wilderness: According to the Wilderness Act of 1964, "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Furthermore, it "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."

Wildland Fire: Any non-structural fire, other than prescribed fire, that occurs in a wildland. Note: Wildland fires include unwanted (wild) fires and naturally-ignited fires that are managed within a prescription to achieve resource benefits.

Wildland Fire Suppression: An appropriate management response to wildland fire that results in the curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Wildland Fire Use: The management of naturally-ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas as outlined in fire management plans. Operational management is described in the Wildland Fire Implementation Plan (WFIP). Wildland fire use is not to be confused with "fire use," which is a broader term encompassing more than just wildland fires.

Wildland/Urban Interface: The line, area or zone where structures and other human development meet or intermingle with wildlands.

Wildland: An area where development is generally limited to infrequent roads, railroads, utility corridors, and widely-scattered structures. The land is not cultivated (i.e., the soil is disturbed less frequently than once in 10 years), is not fallow, and is not in the United States Department of Agriculture (USDA) Conservation Reserve Program. The land may be neglected altogether or

managed for such purposes as wood or forage production, wildlife, recreation, wetlands or protective plant cover. It may be publicly or privately-owned.

APPENDIX C

ENVIRONMENTAL LAWS AND REGULATIONS

RELEVANT LAWS AND REGULATIONS	Summary	AFFECTED RESOURCE(S)
National Environmental Policy Act (NEPA) (42 USC 4321-4370)	Requires Federal agencies to evaluate the environmental impacts of their actions and to integrate such evaluations into their decision-making processes.	All
Council on Environmental Quality (CEQ) Regulations	These regulations (40 CFR 1500-1508) implement NEPA and establish two different levels of environmental analysis: the environmental assessment (EA) and the environmental impact statement (EIS). An EA determines whether significant impacts may result from a proposed action. If significant impacts are identified, an EIS is required to provide the public with a detailed analysis of alternative actions, their impacts, and mitigation measures, if necessary.	All
Antiquities Act (AA) (16 USC 431 et seq.)	Authorizes the President to designate as national monuments any historic landmarks and historic and prehistoric sites, structures, and objects situated on Federal land. Establishes the requirement of a permit for the examination or excavation of such nationally important sites and establishes penalties for their destruction.	Cultural Resources
Archaeological Resources Protection Act (ARPA) (16 USC 470a et seq.)	Ensures the protection and preservation of archeological resources on Federal lands.	Cultural Resources
Clean Air Act (CAA) (42 USC 7401 et seq.)	Among its varied provisions, the CAA establishes standards for air quality in regard to the pollutants generated by internal combustion engines. These standards, known as the National Ambient Air Quality Standards (NAAQS), define the concentrations of these pollutants that are allowable in air to which the general public is exposed ("ambient air").	Air Quality
Clean Water Act (CWA) (33 USC 1251 et seq.)	Section 401, the state water quality certification process, gives states the authority to grant, deny, or condition the issuance of Federal permits that may result in a discharge to the waters of the United States based on compliance with water quality standards. Section 404 regulates the discharge of pollutants, including dredged or fill material, into navigable waters of the U.S. through a permit system jointly administered by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE). Nonpoint sources requirements control pesticide runoff, forestry operations, and parking	Water Resources, Biological Resources

	lots/motor pools. Point sources require individual or group permits and must be monitored at the point at which they enter public waters, storm sewers, or natural waterways. Section 311 (j) requires facilities to prepare a Spill Prevention Control and Countermeasure Plan, containing minimum prevention facilities, restraints against drainage, an oil spill contingency plan, etc.	
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq.)	Provided broad Federal authority to respond directly to releases of hazardous materials that may endanger public health or the environment. Established prohibitions and requirements pertaining to closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when a responsible party cannot be identified.	Hazardous Materials
Endangered Species Act (ESA) (16 USC 1531-1544)	Prohibits the harming of any species listed by the U. S. Fish and Wildlife Service (USFWS) as being either Threatened or Endangered. Harming such species includes not only directly injuring or killing them, but also disrupting the habitat on which they depend.	Biological Resources
Federal Land Policy and Management Act (43 USC et seq.)	Declares that all public lands will be retained in federal ownership unless it is determined that a use other than public will better serve the interests of the nation. Requires that all public land be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, and environmental aspects of the land. Requires that all public lands and their resources be inventoried periodically and systematically.	All
Historic Sites Act (HSA) (16 USC 461 et seq.)	Authorizes the establishment of national historic sites, the preservation of areas of national interest, and the designation and the preservation of national historic landmarks (NHLs). Provides procedures for designation, acquisition, administration, and protection of such sites.	All
Migratory Bird Treaty Act (16 USC 703 et seq.)	Restricts the taking, possession, transportation, sale, purchase, importation, and exportation of migratory birds through permits issued by the USFWS.	Biological Resources
National Emissions Standards for Hazardous Air Pollutants (NESHAP)	Places standards on all hazardous air pollutants and governs such areas as organic liquids, asbestos, polyurethane foam, and wastewater. NESHAP is implemented under U.S. EPA jurisdiction.	Air Quality, Waste Management

National Historic Preservation Act (NHPA) (16 USC 470 et seq.)	Provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. The implementing regulations for the Section 106 process (36 CFR Part 800) have been developed by the Advisory Council on Historic Preservation (ACHP). The Secretary of the Interior maintains a National Register of Historic Places (NRHP) and sets forth significance criteria for inclusion in the register. Cultural resources included in the NRHP, or determined eligible for inclusion, are considered "historic properties" for the purposes of consideration by Federal undertakings.	Cultural Resources
National Park Service Organic Act of 1916 (16 USC et seq.)	Established the National Park Service to manage national parks for the purposes of conserving the scenery, natural resources, historic objects, and wildlife within the parks, and providing for the enjoyment these resources in such manner that will leave them unimpaired for the enjoyment of future generations.	All
Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq.)	Protects Native American human remains, burials, and associated burial goods.	Cultural Resources
Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.)	Regulates all aspects of the handling of hazardous waste through RCRA permits issued by the U.S. EPA.	Hazardous Materials
Safe Drinking Water Act (SDWA) (42 USC 300 et seq.)	Provides for the safety of drinking water throughout the U.S. by establishing and enforcing national drinking water quality standards. Protects public health by establishing safe limits (maximum containment limits) for contaminants based upon the quality of water at the tap, and prevents contamination of surface and ground sources of drinking water. The U.S. EPA is responsible for establishing the national standards; the States are responsible for enforcement of the standards.	Water Resources/ Quality; Human Health & Safety
Wilderness Act of 1964 (16 USC 1121 (note), 1131-1136)	Establishes the National Wilderness Preservation System. Wilderness defined as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain…which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially	Wilderness

	unnoticeable."	
Executive Order 11514: Protection and Enhancement of Environmental Quality	Provides leadership for protecting and enhancing the quality of the Nation's environment to sustain and enrich human life.	All
Executive Order 11593: Protection and Enhancement of the Cultural Environment	Provides leadership for protecting, enhancing, and maintaining the quality of the Nation's historic and cultural environment.	Cultural Resources
Executive Order 12372: Intergovernmental Review of Federal Programs	Directs Federal agencies to consult with and solicit comments from state and local government officials whose jurisdictions would be affected by Federal actions.	All
Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Requires Federal actions to achieve Environmental Justice by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.	All
Executive Order 13007: Protection and Accommodation of Access To "Indian Sacred Sites"	Directs Federal agencies to consider Indian sacred sites in planning agency activities.	Cultural Resources
Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks	Requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children.	All
Executive Order 11990: Protection of Wetlands	An overall wetlands policy for all agencies managing Federal lands, sponsoring Federal projects, or providing Federal funds to State or local projects. It requires Federal agencies to follow avoidance/mitigation/ preservation procedures with public input before proposing new construction projects.	Water Resources, Biological Resources
Executive Order 11988: Floodplain Management	Requires all Federal agencies to take action to reduce the risk of flood loss, to restore and preserve the natural and beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. Because many wetlands are located in floodplains, Executive Order 11988 has the secondary effect of protecting wetlands.	Water Resources, Biological Resources
Executive Order 12856: Federal Compliance With Right-to-Know Laws and Pollution Prevention	Requires that the head of each federal agency be responsible for ensuring that all necessary actions are taken for the prevention of pollution with respect to the agency's activities and facilities, and for	Hazardous Materials

Requirements	ensuring that the agency complies with pollution prevention, emergency planning, and community right-to-know provisions.	

APPENDIX D

SCOPING

NEWS RELEASE u.s. department of the interior

national park service

For Immediate Release George Oviatt/ J.P. Mattingly (870)741-5443

BUFFALO NATIONAL RIVER TO UPDATE FIRE MANAGEMENT PLAN

The National Park Service (NPS), Buffalo National River is in the process of updating its Fire Management Plan (FMP). In order to comply with the National Environmental Policy Act of 1969 (NEPA), the NPS must prepare an Environmental Assessment (EA) for this action. An EA is a planning document that provides for public participation in formulating alternatives for management actions and analyzes the environmental consequences of those alternatives. Ultimately, the EA provides information needed for park officials to reach a decision on how fires will be managed within the boundaries of Buffalo National River. As a preliminary step, the NPS would like public input regarding the alternatives presented below. Comments will assist the NPS in developing preliminary planning alternatives.

The current FMP was completed in 1988 and must be reviewed and updated to meet NPS policy requirements. At present, the FMP describes management responsibilities and actions to be undertaken in the event of unplanned wildland fire ignitions (wildfires), management ignited control burns (prescribed fires), and naturally ignited wildland fires (formerly known as Prescribed Natural Fires, currently described as Wildland Fire Used for Resource Benefits). Current NPS policy emphasizes public and firefighter safety and promotes cooperation between federal, state, and local agencies in the management of fire events. Policy also allows fire to be utilized under pre-described weather and fuel moisture conditions (prescriptions) to reduce hazardous accumulations of wildland fuels and assist with various resource management goals.

The NPS must comply with a variety of laws, regulations, and policies for fire management and resource protection. Each alternative for fire management planning must be consistent with laws and policies and not be in direct opposition to approved management plans. Fire management alternatives might include, but are not limited to, the following:

- Leaving the plan intact as is (aggressive suppression of wildfires, allowing the use of prescribed fire and naturally ignited fire to achieve management goals, and only updating terminology and references to current planning and policy documents).
- Aggressive suppression of any wildland fire and elimination of the use of prescribed fire and naturally ignited fire as a management tool.
- Aggressive suppression of any wildland fire, and using prescribed fire only for the reduction of hazardous wildland fuel buildups.
- Aggressive suppression of any wildland fire, and using prescribed fire only to achieve resource management goals.

Continued

Buffalo National River ● 402 N. Walnut, Suite 136 ● Harrison, Arkansas 72601
Phone 870-741-5443

- Passive suppression of wildfires; taking action only when life or property is under immediate threat.
- No suppression of wildfires; allowing any fire to burn freely and only monitoring fire behavior in order to alert the public and park neighbors of potential threats to life or property.
- Other alternatives

Resource protection and management topics potentially affected by fire management planning and activities include archaeology, vegetation, wildlife, water quality, rare habitats, air quality, wilderness preservation, and aesthetic quality.

Copies of this information can be accessed through the following website:

http://www.nps.gov/buff/planning

Persons can submit in writing comments regarding the Buffalo National River FMP update to the following address:

Superintendent – FMP Comments
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

Or may e-mail comments to:

buff_planning@nps.gov

Comments must be received by December 28, 2001.

XXX

November 27, 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1500 Museum Road, Suite 105
Conway, Arkansas 72032
Tel.: 501 513-4470 Fax: 501/513-4480

IN REPLY REFER TO

December 28, 2001

Superintendent-FMP
National Park Service
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

Dear Mr. Miller:

This is a response to your letter dated November 28, 2001 regarding public input into formulating alternatives for management actions to be included in the Environmental Assessment of the new Fire Management Plan (FMP). The Service has reviewed your letter and the current Fire Management Plan for the Buffalo National River (October 1998). Our comments are outlined below.

In regards to alternatives the Service has the following comments.

1.) An alternative should be created that provides for the aggressive suppression of any wildfire, implementation of prescribed fire and naturally ignited fires to achieve natural resource management goals (including threatened and endangered species), fuel reduction, and wildland urban interface protection.
2.) Depending on the type of updating to current planning stated in the first alternative presented in your letter, the Service may or may not agree that this alternative is appropriate.
3.) The remaining alternatives appear to provide sufficient diversity of action plans, however, a no action is usually included in an EA.

In regards to the current Fire Management Plan the Service has the following comments.

1.) The fire management objectives should include fuel reduction, natural resource management (habitat management, threatened and endangered species inlcuded). Section I.B.
2.) Improvement of threatened and endangered species and species of concern should be managed for as well as game species. Section II.C.2.
3.) A historic fire regime should be followed, but this does not necessarily include manmade fires implemented by Native Americans. Section II.C.3.
4.) Acres of each community type should be included in the description of area. Section II.
5.) Fire research was determined to be a valuable aspect in the original FMP. The Service would be interested in any data available. Section III. E.
6.) Prescribed fire management should include management for threatened and endangered

species. Section IV.
7.) Prescribed fire should also be used for natural resource management including habitat management for threatened and endangered species. Although, this overlaps with other current uses, it should be stated.
8.) Prescribed fire is not recommended for bottomland hardwood sites. The bark is thin and the roots are shallow, offering minimal protection against damage and kill from fire. Section 4.A.4.
9.) Rehabilitation of firelines is recommended, entailing replacement of duff and litter that was scraped off and allowing natural regeneratation of native plant species. However, in highly erodible areas this may not be practical and other measures mentioned in the FMP should be implemented. Section V.A.
10.) Suppression and control of fires are necessary to protect certain threatened and endangered species. However, there are numerous species that require a fire to maintain habitat type. Prescribed fire should not only be used to protect these species and to maintain community types but also to improve habitat for threatened and endangered species. Section VI.A.
11.) Smoke management should also be a concern in regards to threatened and endangered species. For example, bats roosting in caves are possibly susceptible to smoke inhalation and disturbance. For this reason prescribed burns should be conducted when the wind is blowing away from the cave and when the cave is not breathing in due to barometric pressure. Section IV.E.
12.) Monitoring efforts are recommended to determine if fire management is resulting in desired effects.

The following are comments on the appendices.

1.) Prescribed fire for oak-pine communities should also be done to manage for wildlife habitat in conjunction with the other measures stated in Appendix A, page A-3.
2.) The cedar glade association mentioned on page A-4 states that fire should be used to perpetuate native and non-native grasses. Non-native grasses should not be managed for or perpetuated.
3.) River cane restoration is a good aspect to include in the FMP. This subject may want to be broadened and more specific in the new FMP.
4.) Appendix F should include all the federally threatened and endangered species as well as the state. In addition, the Park Service should make every effort practical to manage and conserve species and communities of concern. Although these species are not listed they do need protection to aid in preventing them from being listed in the future. A list of species to address is attached.

Thank you for providing the Service the opportunity to submit comments. If you have any questions please contact Hayley Dikeman at 501-513-4486.

Sincerely,

Lindsey Lewis
Acting Field Supervisor

	A	B	C	D	E	F
1	**HOT SPRINGS NATIONAL PARK**					
2	**Element Name**	**Common Name**	**Federal**	**State**	**Global**	**State**
3			**Status**	**Status**	**Rank**	**Rank**
4	***Plants***					
5	***Non-vascular***					
6	Phormidium treleasei	a blue-green alga	-	Inv	G?	S2
7	***Vascular***					
8	Castanea pumila var. ozarkensis	Ozark chinquapin	-	Inv	G5T3	S3S4
9	Galium arkansanum var. pubiflorum	a bedstraw	-	Inv	G5T2Q	S2
10	Streptanthus obtusiolius	a twistflower	-	Inv	G3	S3S4
11	***Natural Communities***					
12	Novaculite glade-outcrop	-	-	Inv	-	S3
13	Xeric Shortleaf Pine-Oak Forest	-	-	Inv	-	S3
14	**Adjacent Lands**					
15	Haliaeetus leucocephalus	bald eagle	LT			
16	Picoides borealis	red-cockaded woodpecker	LE			
17						
18	**PEA RIDGE NATIONAL PARK**					
19	**Element Name**	**Common Name**	**Federal**	**State**	**Global**	**State**
20			**Status**	**Status**	**Rank**	**Rank**
21	***Vascular Plants***					
22	Castanea pumila var. ozarkensis	Ozark chinquapin	-	Inv	G5T3	S3S4
23	**Adjacent Lands**					
24	Myotis grisescens	Gray myotis	LE	Inv	G3	S2?
25	Amblyopsis rosae	Ozark Cavefish	LE			
26	Haliaeetus leucocephalus	bald eagle	LT			
27						
28	**BUFFALO NATIONAL RIVER**					
29	**Element Name**	**Common Name**	**Federal**	**State**	**Global**	**State**
30			**Status**	**Status**	**Rank**	**Rank**
31	***Animals***					
32	***Invertebrates***					
33	Cyprogenia aberti	western fanshell	-	Inv	G2	S2?
34	Rimulincola divalis	beetle	-	Inv	G1	G2
35	***Vertebrates***					
36	Corynorhinus townsendii ingens	Ozark big-eared bat	LE	Inv	G4T1	S1
37	Limnothlypis swainsonii	Swainson's warbler	-	Inv	G4T1	S3B
38	Myotis grisescens	Gray myotis	LE	Inv	G3	S2?
39	Myotis leibii	Eastern small-footed myotis	-	Inv	G3	S1
40	Myotis sodalis	Indiana myotis	LE	Inv	G2	S2?
41	Notropis ozarcanus	Ozark shiner	-	Inv	G3	S2?
42	***Plants***					
43	***Vascular Plants***					
44	Castanea pumila var. ozarkensis	Ozark chinquapin	-	Inv	G5T3	S3S4
45	Delphinium newtonianum	Moore's larkspur	-	Inv	G3	S3
46	Delphinium treleasei	Trelease's larkspur	-	Inv	G3	S3
47	Neviusia alabamensis	Alabama snow wreath	-	ST	G2	S1S2
48	Tradescantia ozarkana	Ozark spiderwort	-	Inv	G3	S3
49	Trillium pusillum var. ozarkanum	Ozark least trillium	-	Inv	G3T3	S3
50	Valerianella ozarkana	a corn-salad	-	Inv	G3	S3
51	***Natural Communities***					
52	Post oak savannah	-				
53	Cane breaks	-				
54	Glades	-				
55	**Adjacent Lands**					
56	Haliaeetus leucocephalus	bald eagle	LT			

Page 1 of 1

01/02/2002 WED 08:16 [TX/RX NO 5628] 004

Arkansas Game & Fish Commission

2 Natural Resources Drive Little Rock, Arkansas 72205

12/31/01

December 21, 2001

Ivan D. Miller
Superintendent-FMP Comments
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

Mr. Miller:

Thank you for the opportunity to submit comments regarding the Fire Management Plan Environmental Assessment for the Buffalo NR. Our two agencies have enjoyed a cooperative relationship for several years now and it's our pleasure to help in acknowledging responsible management of the ecosystems we hold so dear.

Since most of the landscapes we've inherited in Arkansas have had an incredible history of both natural as well as cultural fires which served to sustain their very character, our agency is very supportive of an aggressive use of prescribed fire in management. Our upland oak-hickory forest communities are dependent upon this vital tool in order to sustain health, vigor and regenerate the next forest. In an attempt to correct past practices that have favored a dense understory of fire intolerant species, aggressive use of fire will be needed to return these forested communities to their previous status and allow for their sustainability. We do believe that the use of fire should be controlled by implementing defined atmospheric parameters and intended to reach specific vegetative goals. We also support the protection of adjacent private lands and the use of fire in a prescribed manner. Additionally, due to the long interruption in fire history, we believe that prescribed burning alone might not allow us to reach the more open woodland conditions of the past. Therefore, we not only **support aggressive suppression of wildfires and the use of prescribed burning to achieve management goals**, but our agency also supports the use of both mechanical and chemical means of vegetative control in reaching habitat goals. Fire alone will most likely not reclaim the historical vegetative communities that once occurred within the Buffalo River corridor. Species such as elk, wild turkey, white-tailed deer and black bear are common to the type of open, oak-dominated

Phone: 501-223-6300 Fax: 501-223-6448 Website: www.agfc.com

Ivan Miller
Page 2

woodland habitat that our agency would like to see restored on these lands.

Again, thanks for the opportunity to voice our agency's support for active resource management.

Cordially,

Donny Harris
Chief
Wildlife Management Division

ARKANSAS GAME AND FISH COMMISSION

#2 NATURAL RESOURCES DRIVE

LITTLE ROCK, AR. 72205

January 2, 2002

Mr. Ivan Miller, Superintendent
National Park Service, Buffalo National River
402 North Walnut, Suite 136
Harrison, Ar. 72601

Dear Mr. Miller:

Thank you for the opportunity to comment on your Fire Management Plan. I would like to applaud your efforts with regard to wildfire suppression and prescribed fire projects during my tenure here at Buffalo National River. The Resource Management staff are professionals in every sense of the word and have provided much needed assistance and guidance to me and the agency. I support leaving the FMP intact, and updating terminology and references to current planning and policy documents.

Sincerely, Mark B

Mark Baron, Project Coordinator, Arkansas Game and Fish Commission
9594 Hwy. 43 South
Harrison, Ar. 72601

Arkansas Game & Fish Commission

2 Natural Resources Drive Little Rock, Arkansas 72205

Hugh C. Durham
Director

January 2, 2002

Mr. Ivan D. Miller, Superintendent
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

Dear Mr. Miller:

This letter is in reference to the Buffalo National River Fire Management Plan.

As a Cooperative Agency, we are very proud of the accomplishments of the BNR fire program over the past several years. This work has improved the habitat for many wildlife species and has improved relations with many Arkansas sportsmen. The fire program is extremely important to the Buffalo River elk herd in providing quality food and maintaining openings.

We fully support the first alternative – leaving the plan intact. Keep up the good work.

Sincerely,

Eddie Linebarger

Eddie Linebarger
Regional Supervisor
Wildlife Management Division

EL:mcr
Cc: D. Goad

Phone: 501-223-6305 Fax: 501-223-6448 Website: www.agfc.com

The mission of the Arkansas Game and Fish Commission is to wisely manage all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people.

Arkansas Game & Fish Commission

2 Natural Resources Drive Little Rock, Arkansas 72205

Hugh C. Durham
Director

January 4, 2002

Mr. Ivan Miller, Superintendent
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

Dear Mr. Miller:

This letter is in reference to public input regarding alternatives to the Buffalo National River Fire Management Plan.

First of all, I want to commend the National Park Service for the many accomplishments during the past several years that have been achieved under the current fire management plan. Habitat for the wide variety of wildlife species found on the Buffalo National River has been enhanced significantly. This, in turn, has improved relations between the National Park Service, Arkansas Game and Fish Commission and consumptive and non-consumptive users of the wildlife resources.

The fire program is extremely important for elk along the Buffalo River as it provides quantity and quality food resources to maintain the herd on a long-term basis. I support leaving the plan in tact (first alternative). Again, I want to commend you and your staff for the great wildlife benefits provided by the fire program. I look forward to continuing cooperative efforts between our agencies to further the cause of wildlife conservation.

Cordially,

Michael E. Cartwright
Elk Program Coordinator
Wildlife Management Division
P.O. Box 729
Calico Rock, AR 72519

1-870-297-4331

CC: Mark Clark
David Goad
File

Phone: 501-223-6305 Fax: 501-223-6448 Website: www.agfc.com

The mission of the Arkansas Game and Fish Commission is to wisely manage all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people.

The Department of
Arkansas
Heritage

Mike Huckabee, Governor
Cathie Matthews, Director

Arkansas Arts Council
▪
Arkansas Natural Heritage Commission
▪
Historic Arkansas Museum
▪
Delta Cultural Center
▪
Old State House Museum

Arkansas Historic
Preservation Program

1500 Tower Building
323 Center Street
Little Rock, AR 72201
(501)324-9880
fax: (501)324-9184
tdd: (501)324-9811
e-mail:
info@arkansaspreservation.org
website:
www.arkansaspreservation.org

12/27/01

December 18, 2001

Mr. Ivan D. Miller
National Park Service
Buffalo National River
402 North Walnut, Suite 136
Harrison, Arkansas 72601

RE: Multi County – General
Section 106 Review – DOI
Buffalo National River Fire Management Plan
AHPP Tracking No. 44884

Dear Mr. Miller:

We have reviewed your letter of November 28,2001 regarding an Environmental Assessment for the Buffalo National River's updated Fire Management Plan. Unfortunately, we are unable to access your website for the information that we need to comment on this undertaking. Please mail this information to us as soon as possible.

Thank you for your interest and concern for the cultural heritage of Arkansas. If you have any questions, please contact me at (501) 324-9880.

Sincerely,

Steven M. Imhoff
Staff Archeologist

An Equal Opportunity Employer

"JAMES HINES" <Wolf82553@msn.com >

03/01/2002 07:44 AM PST

To: <buff_planning@nps.gov>
cc:
Subject: fire management plan

Please add my name to the fire management plan mailing list.

Thank you,

James Hines
P.O. Box 6058
Ventura, CA 93006

"Charlotte Bornemeier" <CBornemeier@tnc.org>
02/20/2002 10:26 AM MST

To: BUFF Planning
cc: "Scott Simon" <ssimon@TNC.ORG>
Subject: Copy of Fire Management Plan for the Buffalo National River

---

Scott Simon, our Director of Conservation Science, previously requested a copy of the updated Buffalo National River Fire Management Plan but has not yet received it. Is this copy available? Please let me know by return E-mail. If it is available, please send to the following address:

Scott Simon
Director of Conservation Science
The Nature Conservancy
601 N. University
Little Rock, AR 72205

Thanks for your assistance.

INTER-AGENCY AGREEMENT FOR FIRE MANAGEMENT

Among the

BUREAU OF LAND MANAGEMENT

BUREAU OF INDIAN AFFAIRS

NATIONAL PARK SERVICE

U.S. FISH AND WILDLIFE SERVICE

of the

UNITED STATES DEPARTMENT OF THE INTERIOR

and the

FOREST SERVICE

of the

UNITED STATES DEPARTMENT OF AGRICULTURE

BLM Agreement No. 1422RAI03-0001
FS Agreement No. 02-A-11132543-211
FWS Agreement No.
BIA Agreement No.
NPS Agreement No.

I. INTRODUCTION.

Fire management in the nation=s wildlands is an on-going concern to the American public and to the land management bureaus of the Department of the Interior and the Department of Agriculture, Forest Service, hereafter Aagencies.@ Considerable progress has been made in fire management planning, fire use, and fire suppression by all agencies and continued progress can be achieved by concerted cooperation and coordination among the agencies. Because fire recognizes no boundaries, programs must lead to more productive cooperation and efficient operations among these agencies.

II. AUTHORITY.

A. Protection Act of 1922 (16 U.S.C. § 594).

B. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. § 1856a).

C. Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. § 1535), as amended.

D. Federal Land Policy and Management Act of 1976 (43 U.S.C. § 1702).

E. National Park Service Organic Act of August 1916 (16 U.S.C. § 1).

F. National Wildlife Refuge Administration Act of June 27, 1998 (16 U.S.C. § 668dd)

G. Disaster Relief Act of 1974 (42 U.S.C. § 1521).

H. National Indian Forest Resources Management Act of 1990 (25 U.S.C. § 3101).

I. Cooperative Forestry Assistance Act of 1978 (P.L. 95-313, 92 Stat. 365 as amended; 16 U.S.C. § 2101 (note), 2101-2103, 2103a, 2103b, 2104-2105).

III. OBJECTIVE.

A. To provide a basis for cooperation among the agencies on all aspects of wildland fire management and as authorized in non-fire emergencies.

B. To facilitate the exchange of personnel, equipment (including aircraft), supplies, services, and funds among the agencies.

IV. PROGRAM COVERAGE.

The agencies agree to cooperate in the full spectrum of wildland fire management activities, and in non-fire emergencies as authorized, to achieve land management goals. Cooperative efforts shall be provided at the national, geographical, and local levels to facilitate efficient use of personnel, supplies, equipment, training, public education, aviation services and other resources. Activities may include, but are not limited to:

A. Prevention of human-caused wildland fires;

B. Training of personnel to agreed common standards;

C. Preparedness for wildland fire suppression;

D. Suppression of wildland fires;

E. Emergency stabilization and rehabilitation of areas burned by wildland fires, and may include Burned Area Emergency Rehabilitation (BAER) work;

F. Development and exchange of technology and databases;

G. Development and distribution of cost information;

H. Fuels management, including prescribed fires;

I. Identification and establishment of interagency fire management resources;

J. Development of annual local, geographical, and national operating plans;

K. Fire research, administrative/management studies, and technology development;

L. Interagency Joint Fire Science/Research and Management projects; and

M. Rural fire assistance.

V. STATEMENT OF WORK.

A. Agencies will develop mutually beneficial fire management plans, including activities previously identified in Section IV.

B. Agencies will develop cooperative arrangements to cover administrative and jurisdictional responsibilities that will provide for:

1. Use of closest-forces and total mobility concepts for wildland fire suppression, including personnel, equipment, and supplies;

2. Development and use of fire equipment and supply caches compatible with total interagency requirements by local, geographical, and national needs;

3. Training to mutually agreeable common standards and curricula;

4. Mutually acceptable performance qualifications and standards for all fire management positions;

5. Mutual assistance for managing wildland fires that are managed for resource benefits; and

6. Mutual assistance for conducting hazardous fuels reduction, wildland urban interface treatments, and ecosystem restoration and maintenance using prescribed fire.

C. Agency representatives shall coordinate and exchange fire management plans, to include information on available personnel, equipment and supplies as necessary.

D. Agencies will mutually monitor fire suppression equipment and supplies to assure that proper distribution and quantities are on hand to meet potential needs.

E. Unless otherwise provided for, an agency is expected to take prompt initial action, with or without request, on wildland fires within zones of mutual interest. Where one agency takes initial action in the protective unit of the other, the initially acting agency shall continue to fight the fire until relieved by an officer of the designated management agency.

F. When wildland fires burn on, or threaten, lands of more than one agency, joint planning will be conducted by local officials of the representative agencies to suppress the wildland fire.

VI. BILLING/PAYMENT PROCEDURES.

A. Billing procedures for fire management activities are as follows:

1. Emergency Fire Suppression - Agencies shall not bill for services rendered to the signatory agencies of this Agreement except by mutual agreement when an agency has exhausted all other provisions and resources for internally funding suppression activities.

2. Severity – Agencies shall not bill for services rendered pursuant to a Severity Request for wildland fire resources made by signatory agencies to this Agreement.
"Severity Request" is defined as authority to access suppression funds on a case-by-case basis, in addition to preparedness funds, to mitigate losses when abnormal fire conditions occur.

3. Fire Management Projects - Agencies may choose to bill one another by mutual agreement once they have exhausted all other provisions for internally funding mutual assists, as provided in A.7, below. (See activities listed in Section IV, Program Coverage.)

4. Fire Preparedness – Agencies may choose to bill one another by mutual agreement for fire program management and readiness activities paid with wildland fire preparedness funds.

5. Mobilization of State Fire Suppression Resources – The Forest Service will pay costs for Interstate assistance incurred by the State providing resources. Intrastate assistance will be paid by the receiving Forest Service/Interior agency as provided by local Federal agency/State Agreements.

6. Emergency Stabilization and Rehabilitation – Agencies shall not bill for fire rehabilitation planning services rendered by the signatory agencies of this Agreement. Agencies may choose to bill one another by mutual agreement for fire rehabilitation implementation.

7. The Interior agencies have agreed to not reimburse one another for services rendered to one another under the budget Activity codes for "Hazard Fuels Reduction Operations" and "Wildland Urban Interface" except as follows below in paragraphs a. and b.

   a. Each Interior agency will retain reserve funds for these activities at the national, state or regional levels that will be used to establish interagency assist accounts. Local field units can charge these assist accounts when they render assistance to neighboring agencies. If an agency exhausts its reserve funds for interagency assistance, projected deficiencies will be covered through interagency funding transfers, following normal departmental protocols.

   b. The Interior agencies agree to use their assist accounts to provide project assistance to the Forest Service. The Forest Service agrees to establish comparable reserve funds at the regional or National Forest level that can be used to assist Interior agencies with Hazard Fuels Reduction and Wildland Urban Interface projects. Interior agencies and the Forest Service may seek reimbursement from each other once reserve funds have been exhausted and there is no opportunity to use reciprocal services to achieve performance targets.

B. Billing and collection procedures will follow the Intra-governmental Payment and Collection (IPAC) system process.

C. Each agency shall, upon request, forward specific cost information for billings.

D. Indirect administrative surcharges will not be assessed by any signatory agency for preparedness activities performed for another agency.

E. Indirect administrative fees of signatory agencies for Fire Research and Development and Joint Fire Science Program administrative activities cannot exceed 15 percent for an agency's internal activities and 10 percent for pass through activities. Fees in excess of these limits must be justified and have mutual agreement by the affected parties that are signatory to this Agreement.

VII. GENERAL PROVISIONS.

A. Each agency shall make direct settlement from its own funds for all liabilities it incurs under this Agreement.

B. Parties to this Agreement are not obligated to make expenditures of funds under terms of this Agreement unless such funds are appropriated for the purpose by the Congress of the United States, or are otherwise legitimately available under the annual Appropriations Acts. If some extraordinary emergency or unusual circumstance arises that could not be anticipated and that could involve expenditures in excess of available funds for the protection of life or property, the affected agency or agencies shall immediately seek supplemental appropriations or permission for reprogramming to meet their respective shares of such emergency obligations.

C. This Agreement will take effect on the date of the last signature. The Agreement shall remain in effect until September 30, 2008. Any signatory agency may terminate its participation in this Agreement by written notice to all other signatories provided that such notice shall be given between the dates of October 1 of any year and February 1 of the following year. The termination will become effective immediately upon the date of notice. Full credit shall be allowed for each party's expense and all non-cancelable obligations properly incurred up to the effective date of termination. In such case, this Agreement will remain in full force and effect with respect to the remaining signatory agencies.

D. Amendments and modifications to this Agreement may be initiated by any signatory agency. The amendments and modifications shall not take effect until documented and signed by all signatory agencies. The Bureau of Land Management is designated as the agency responsible for all administrative oversight of amendments and modifications to this Agreement.

E. Financial obligations, as warranted, under this Agreement, to accomplish activities under Section IV, must be approved for each agency by the responsible officers at the appropriate level operating within their authority, and funding will be obligated by task orders under this Agreement, except under IV.D, which will be accomplished through Resource Orders when required.

F. The *Reciprocal Fire Protection Act* specifically authorizes the execution of agreements between agencies of the United States, and other agencies and instrumentalities for mutual aid in fire protection and other fire management purposes. An Economy Act Determination to support reimbursement is not required in these instances. The Economy Act applies when more specific authority does not exist, as stated in the *Federal Acquisition Regulations* (FAR) §17.500(b).

VIII. TASK ORDERS.

A. Specific projects to be funded and performed under this Agreement shall be identified in separate task orders developed among the agencies involved in each project. Task Orders will contain the following minimum information:

1. Detailed description of services to be performed or supplies to be delivered;

2. Description of the deliverables;

3. Time period for completion;

4. Target cost/price;

5. Identify responsible project officials for each agency;

6. Payment procedures will follow the Intra-governmental Payment and Collection (IPAC) system process, which includes identification of codes, advance payments or reimbursement; and

7. Task Orders must be signed by authorized personnel with authority to obligate and commit funds for each agency.

B. Task Orders may be prepared in any format acceptable to the agencies involved in each project.

IX. WAIVER.

Each party to this Agreement does hereby expressly waive all claims against the other party for compensation for any loss, damage, personal injury or death occurring in consequence of the performance of this Agreement.

X. DURATION; SUPERSEDES PRIOR AGREEMENT

This Agreement is effective on the last date of execution and will remain in effect until September 30, 2008. This Agreement supersedes AThe Interagency Agreement between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, of the United States Department of the Interior, and the United States Forest Service of the Department of Agriculture" effective February 20, 1997, and all amendments and modifications thereto.

/s/ J. M. Hughers for 9/11/02
Kathleen Clarke, Director Date
Bureau of Land Management

/s/ Richard A. Harter 10/01/02
Richard A. Harter, Suprv. Contract Officer Date
Bureau of Land Management, NIFC

/s/ Dale N. Bosworth 09/23/02
Dale N. Bosworth, Chief Date
Forest Service

/s/ Terrance Virderi 09/24/02
Terrance Virderi, Deputy Commissioner Date
Bureau of Indian Affairs

/s/ Steve Williams 10/01/02
Steve Williams, Director Date
Fish and Wildlife Service

/s/ Fran P. Mainella 09/30/02
Fran P. Mainella, Director Date
National Park Service

The Department of
Arkansas
Heritage

Mike Huckabee, Governor
Cathie Matthews, Director

Arkansas Arts Council
Arkansas Natural Heritage Commission
Historic Arkansas Museum
Delta Cultural Center
Old State House Museum

Arkansas Historic Preservation Program

1500 Tower Building
323 Center Street
Little Rock, AR 72201
(501)324-9880
fax: (501)324-9184
tdd: (501)324-9811
e-mail:
info@arkansaspreservation.org
website:
www.arkansaspreservation.org

An Equal Opportunity Employer

December 11, 2002

Mr. Ivan D. Miller
Superintendent
Buffalo National River
402 North Walnut, Suite 136
Harrison, Arkansas 72602

RE: Multi County - General
Section 106 Review - NPS
Buffalo National River Fire Management Plan
AHPP Tracking No: 47495

Dear Mr. Miller:

My staff has reviewed the above-referenced fire management plan. We note that paragraph A2 on page 43 indicates that only historic structures listed in the National Register of Historic Places (NRHP) will be protected from fire. We recommend that this be reworded to include structures listed or eligible for inclusion in the NRHP. Otherwise, we find this plan to be acceptable provided that prescribed burn activities are submitted to this office for review and comment.

Thank you for your interest and concern for the cultural heritage of Arkansas. If you have any questions, please contact Steve Imhoff of my staff at (501) 324-9880.

Sincerely,

Ken Grunewald
Deputy State Historic Preservation Officer

cc: Dr. Ann M. Early, Arkansas Archeological Survey
Mr. Jim Roan Gray, Osage Nation

APPENDIX E

E. ANNUAL REVISION DOCUMENTS

1. Fire Call-up List

BUFFALO NATIONAL RIVER

FIRE CALL-UP LIST (updated 1/17/03)

Note: * indicates lacking currency for position

Name	Park	Red Card Qualifications	Contact Phone # (home)
Angelo, Diana	BUFF	EDRC	all maintained in fire Management office
Ashcraft, John	BUFF	FFT1, FALA, FEMO HECM(T), ENGB(T)	
Baron, Tim	BUFF	FFT2, FFT1(T)	
Bitting, Carol	BUFF	FFT2	
Bitting, Charles “Chuck”	BUFF	CRWB, ENGB, ICT4 RXI2, *LSCT, ATVO	
Brumbaugh, Rolland (Lee)	BUFF	FFT2, SEC1	
Campbell, Justin	BUFF	FFT2	
Collins, Tony	BUFF	FFT1, HECM(T) CRWB(T)	
Comer, Greg	BUFF	FFT2	
Coppola, Rochelle	BUFF	EDRC(T), PTRC(T)	
Crawford, Colby	BUFF	FFT1	
Crawford, Lenora	BUFF	EDRC(T), PTRC(T)	
Frioli, Jo Ann	BUFF	FFT2	
Howard, Bob	BUFF	FFT2, SEC1 *CRWB, *ICT4, *SECM(T)	
Hoyt, Ricky	BUFF	FFT2	
Isham, Sean	BUFF	FFT2	

Name	Park	Red Card Qualifications	Contact Phone # (home)
Jackson, Allison	BUFF	FFT1, ICT5, HECM, PACK, READ, BCMG(T), CRWB(T), FALC(T), IOF3(T)	
Jenks, Aaron	BUFF	FFT2, FEMO, FFTI(T)	
Joyner, Angela	BUFF	FFT2	
Lail, Sam	BUFF	CRWB, DIVS, ENGB, *FIRB, ICT3, ICT4, *STRC, STEN, *HLDS, RXB2, RXI2, *OSC2(T), SOF2 (T)	
Lively, Mike	BUFF	*EQTR, *PROC, *PTRC *FSC2(T), *TIME(T)	
Luraas, Adam	BUFF	FFT1, HECM, ICT5, FALB, HETM, FEMO ABRO(T), CRWB(T), FALC(T), RXI2(T)	
MacMillan, Dale	BUFF	DIVS, ICT3, STRC, TFLD, EMTB, RXB2, RXI2, FOBS (T), SEC1	
Maguire, Robert	BUFF	FFT1, *MEDL, SECM, EMTI	
Mattingly, James P.	BUFF	DIVS, *FALC, SOF2, RXB2, ICT3, *FELB, ATVO, *LSCT, FOBS(T), OSC2(T), RXFM(T),	
Mays, Noel	BUFF	FFT1, FEMO ATVO	
McClenathan, Doug	BUFF	FFT2, *FFTI(T)	
McConchie, Scott	BUFF	FFT1, ATVO	
Mott, David	BUFF	FFT2, HYDR	
Newman, Dwight	BUFF	FFT1, ENGB	
Parrish, Ron	BUFF	FFT1, HECM, MEDL, EMTI, HECM(T)	
Shipley, Jeff	BUFF	FFT1, FALB, RXCM,	

Name	Park	Red Card Qualifications	Contact Phone # (home)
Smithyman, Mike	BUFF	FFT1, SEC1, ICT5, EMTB, SECM (T)	
Struble, William	BUFF	FFT2, EDRC(T)	
Suppa, Chad	BUFF	CRWB, ENGB, FFT1, FOBS, HECM, ICT4, STEN, RXB2, RXI2, FALC, PLDO, HEMG(T)	
Usery, Faron	BUFF	FFT2	
Van Cott, William	BUFF	*FFT1, SEC1 *CRWB, EMTB, *FIRB, *FOBS, *ICT4, *SECM, *TFLD, *RXI2, *DIVS(T), *ICT3(T), *MEDL(T), *STCR(T), *STEN(T), *RXB2(T)	
Walter, Susan	BUFF	EMTB, SCKN(T)	
Watkins, Connie	BUFF	EDRC, PTRC, EDSD(T)	
West, Jeff	BUFF	CRWB, ICT4, MEDL, ENGB, *ICT3 (T), TFLD(T) EMTB, *LSCT	
Whitaker, Tracy	BUFF	FFT1, SEC1, ENGB, EMT, CRWB(T)	
Wiggs, Ray	BUFF	FFT1, FALB, *ICT4	
Williams, Chris	BUFF	FFT1, HECM	
Wood, April	BUFF	FFT2	

BUFFALO NATIONAL RIVER EMERGENCY HIRES (AD's):

Name	Park	Red Card Qualifications	Contact Phone # (home)
Baron, Mark	BUFF	FFT2	
Bryant, Jason	BUFF	FFT2	
English, Shane	BUFF	FFT2	
French, Edd	BUFF	FFT2	

Name	Park	Red Card Qualifications	Contact Phone # (home)
Jackson, Daniel	BUFF	FFT2	
Loggins, Craig	BUFF	FFT2	
Oviatt, George	BUFF	FFT2, *RXB2, ORDM RXI2	
Underdown, Mike	BUFF	FFT2	

2. Preparedness Inventory

The tables following contain the inventory of each of the three caches on the River.

Table 1 – Pruitt Cache Inventory

Pruitt Fire Cache Inventory		
5/21/02		
Item	**On Hand**	**Stocking Level**
PPE		
Fire Shelter (complete unit)	5	5
Nomex pants (misc. sizes, jeans)	3	5
Nomex pants, 32 x 34	7	5
Nomex pants, 34 x 34	5	5
Nomex shirt, large	3	5
Ear Plugs, 1 box	1	1
Glasses, safety, clear	0	5
Gloves, large	0	5
Goggles, clear	5	5
Hard Hat	5	5
Water Handling		
Backpack Pump, nylon	5	5
Backpack Pump, rigid can	3	3
Foam, *Fire-Trol*, 5 gal.	3	1
Foam, *Silvex*, 5 gal.	1	1
Hose, 1" 100 ft. synthetic	4	5
Hose, 1.5" 100 ft. cotton	7	
Hose, 1.5" 100 ft. synthetic	34	30
Hose, 1.5" 50 ft. cotton	6	
Hose, 1.5" 50 ft. syn/rubber lined	7	
Hose, 3/4" 50 ft.	2	5
Miscellaneous Supplies		
Batteries, AA, 1 box (24 ea.)	0	3
Batteries, D, 1 box (8 ea.)	0	3
Canteen case, cloth	13	10
Canteen, 1 qt.	17	10
Equipment Belt (web gear)	8	5
Fireline Pack, *GSA*, yellow	5	5
First Aid Kit, personal	5	5
Head Lantern *(D cell)*	5	
Headlamp Bulb, spare	5	5
Headlamp, firefighter's *(AA cell)*	5	5
Sleeping Bag, summer	11	5
Handtools		
Council Rake	10	10
Flapper	2	2
Leaf Rake	10	10
Pulaski	10	10
Shovel, forest fire	10	10

Table 2 – Tyler Bend Cache Inventory

Tyler Bend Fire Cache Inventory		
5/21/02		
Item	**On Hand**	**Stocking Level**
PPE		
Shirt, large	10	10
Shirt, large, long	3	4
Shirt, medium	30	10
Shirt, medium, long	4	4
Shirt, small	0	4
Shirt, small, long	2	2
Shirt, XL	1	10
Shirt, XL, long	4	4
Shirt, XXL	2	4
Shirt, XXL. Long	2	4
Pants, BDU, 26-30 x 30	0	4
Pants, BDU, 30-34 x 30	0	4
Pants, BDU, 32-36 x 30	1	4
Pants, BDU, 34-38 x 30	0	4
Pants, BDU, 36-40 x 30	0	4
Pants, BDU, 40-44 x 30	0	4
Pants, BDU, 26-30 x 34	0	4
Pants, BDU, 28-32 x 34	0	4
Pants, BDU, 30-34 x 34	5	6
Pants, BDU, 32-36 x 34	6	6
Pants, BDU, 34-38 x 34	0	4
Pants, BDU, 36-40 x 34	1	6
Pants, BDU, 40-44 x 34	4	4
Pants, Jeans, 30 x 30	1	NR
Pants, Jeans, 32 x 30	7	NR
Pants, Jeans, 34 x 30	1	NR
Pants, Jeans, 36 x 30	0	NR
Pants, Jeans, 38 x 30	1	NR
Pants, Jeans, 40 x 30	3	NR
Pants, Jeans, 30 x 34	1	NR
Pants, Jeans, 32 x 34	20	NR
Pants, Jeans, 34 x 34	10	NR
Pants, Jeans, 36 x 34	3	NR
Pants, Jeans, 38 x 34	1	NR
Pants, Jeans, 40 x 34	1	NR
Pants, Jeans, 35 x 37	1	NR
Pants, Jeans, 32 x 32	2	NR
Pants, Jeans, 28 x 34	2	NR
Pants, Jeans, 26 x 30	1	NR
Brush Jacket Liner, small	5	NR
Brush Jacket, small	5	NR
Brush Jacket Liner, medium	3	NR
Brush Jacket, medium	2	NR
Brush Jacket Liner, large	2	NR
Brush Jacket, large	0	NR
Brush Jacket Liner, extra large	1	NR

Tyler Bend Fire Cache Inventory		
5/21/02		
Item	**On Hand**	**Stocking Level**
Brush Jacket, extra large	5	NR
Water Handling		
Adapter, 1.5" NH – 1.5" NPSH	3	2
Adapter, 1.5" NPSH – 1.5" NH	0	2
Cap, 1.5"	6	2
Clamp, Fire Hose	4	4
Double-female, 1" NPSH	0	2
Double-female, 1.5" NH	4	2
Double-male, 1" NPSH	2	2
Double-male, 1.5" NH	5	2
Foam, *Fire-Trol*, 5 gal.	2	2
Foam, *Silvex*, 5 gal.	3	2
Foot Valve w/ strainer, 1.5" NH	3	2
Gasket, hose, assorted	1	1
Hose, synthetic 1", 100 ft.	1	4
Hose, synthetic 1.5", 100 ft.	0	4
Hose, synthetic 3/4", 50 ft.	6	6
Mop-up wand	3	4
Nozzle Tip, 3 gpm fog	0	4
Nozzle Tip, 3/16" straight stream	3	4
Nozzle Tip, 3/8" straight stream	1	2
Nozzle, 1" aluminum barrel-type	6	2
Nozzle, 1" brass barrel	2	2
Nozzle, 1" plastic barrel-type	3	2
Nozzle, 1.5" aluminum barrel	0	2
Nozzle, 1.5" *Bubble Cup*	4	2
Nozzle, 1" *QuadraFog*	3	2
Nozzle, 1.5" plastic barrel-type	4	2
Nozzle, 1.5" foam	0	2
Nozzle, ¾" foam	0	2
Nozzle, ¾" garden hose, brass	1	2
Nozzle, Forester Fog	0	4
Pressure Relief Valve, 1.5"	2	2
Pail, collapsible, 3 gal.	1	2
Pump, Backpack	2	4
Reducer, 1" NPSH - ¾ NH"	16	5
Reducer, 1.5" NH - 1" NPSH	12	5
Reducer, 1.5" NPSH – 1" NPSH"	1	5
Reducer, 2.5" NPSH – 1.5" NH	0	5
Tee, capped, 1" NPSH - 1" NPSH	4	5
Tee, capped, 1.5" NH - 1" NPSH	20	5
Tee, valved, 1.5" NH – 1" NPSH	4	5
Valve, 1" gated wye	4	2
Valve, 1.5" gated wye	8	2
Valve, 3/4" gated wye	0	4
Valve, Ball Shut-off, 1" NPSH	3	2
Valve, Ball Shut-off, 1.5" NH	1	2
Valve, Shut-off, 3/4" garden hose	4	4
Wrench, hydrant	3	2

Tyler Bend Fire Cache Inventory		
5/21/02		
Item	**On Hand**	**Stocking Level**
Wrench, spanner, 1" – 1.5"	12	4
Wrench, spanner, 1" – 2.5"	1	2
Wrench, spanner, universal	3	2
Wye, 1.5" to 1" ungated	4	2
Saw Supplies		
Air Filter	0	3
Air Filter	0	3
Axe, single bit	1	2
Bar Oil, 1 gal.	4	6
Chaps, chainsaw, 32"	0	2
Chaps, chainsaw, 36"	4	2
Fuel Bottle, aluminum,1 liter	2	5
Fuel Bottle, aluminum, 33 oz.	1	5
File, chain saw, 7/32"	40	12
Nut, bar cover	5	6
Saw chain, *Carlton*, 100 ft.	1	1
Saw Kit (field pouch)	5	5
Scrench	10	5
Spark plug	2	5
Spark plug	3	5
Wedge, large	9	5
Wedge, medium	5	5
Wedge, small	2	5
Handtools		
Brush Hook	6	2
Council Rake	10	10
Flapper	7	5
Leaf Rake	17	10
McCleod	10	5
Pulaski	10	10
Fire Broom	2	2
Shovel, standard blade	4	2
Shovel, flat blade	3	2
Shovel, forest fire	5	5
Ax, single-bit	3	1
Ax, double-bit	6	2
Adze	2	2
Pick-Ax	2	2
Miscellaneous Supplies		
Antifreeze, gal.	1	1
Batteries, AA, 1 box (24 ea.)	1	6
Batteries, C, 1 box (4 ea.)	1	1
Batteries, D, 1 box (8 ea.)	1	5
Caution Flasher	4	4
Dolmar, 1.5 gal	2	3
Drip Torch	3	4
File, flat, 10"	6	5
File, flat, 12"	6	5
Fire Shelter, training system	11	10

Tyler Bend Fire Cache Inventory		
5/21/02		
Item	**On Hand**	**Stocking Level**
Fluid, brake	1	2
Fluid, power steering	2	2
Fluid, purging, pint, 1 dozen	1	1
Fluid, transmission, quart.	2	2
Fluid, windshield washer, gal.	1	1
Fusee, 1 box (72 ea.)	1	1
Gas treatment, *Stabil*, 32 oz.	2	2
Helmet, large	2	2
Helmet, medium	2	2
Helmet, X-large	2	2
Oil, *Rotella*, 15W40, gal.	1	1
Oil, Two-cycle, *Stihl*, 8 oz.	6	6
Oil, Vehicle, 10W30, quart.	0	6
Radio Charger (mobile), *King*	4	4
Rations, box (12 ea.)	2	3
Sign, "Prescribed Fire"	2	2
Sign, "Smoke Ahead"	2	2
Sleeping Bag, cold weather	5	5
Sleeping Bag, summer	11	10

Table 3 – Buffalo Point Cache Inventory

Buffalo Point Fire Cache Inventory		
5/28/02		
Item	**On Hand**	**Stocking Level**
Tools		
Leaf Rake	3	
Flapper	8	
McLeod	8	
Council Tool	6	
Pulaski	6	
Shovel	5	
Axe-single bit	6	
Axe-double	3	
Brush Hook	2	
Bow Saw	1	
Trimmer	1	
Chain Saw	1	
Chain Saw with kit	2	
Back-Pack Pump	3	
Drip Torch	1	
Fusees	16	
Belt Wx Kit	1	
Foam	15 gal	
Flagging	6 roll	
PPE		

Buffalo Point Fire Cache Inventory		
5/28/02		
Item	**On Hand**	**Stocking Level**
Shirt, Small	4	
Shirt, Med	6	
Shirt, Lrg	5	
Shirt, Xlrg	0	
Pant, 30	5	
Pant, 32	3	
Pant, 34	8	
Pant, 36	5	
Pant, 38	3	
Helmet	10	
Helmet Suspension	8	
Safety Goggle	2	
Ear Plug	1 bx	
Glove, sm	0	
Glove, med	1	
Glove, lg	1	
Glove, xlg	1	
Miscellaneous Equipment		
Red Pack	4	
Yellow Pack	7	
Fire Shelter w/case and Cover	6	
Fire Shelter - Practice	3	
Head lamp	2	
Vest	2	

3. Cooperative Agreements

MEMORANDUM OF UNDERSTANDING FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

Memorandum of Understanding between the National Park Service and the Rea Valley Volunteer Fire Department

Agreement#G7150010004

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the Rea Valley Fire Department acting through its Assistant Chief. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfire and in conducting search and rescue operations on lands within the Park's boundaries, within the Rea Valley Fire District, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The Rea Valley Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the Rea Valley Fire District and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § l856a (1994).

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the Rea Valley Fire Department, qualified, on-duty NPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the Rea Valley Fire District or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement, NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m., Monday through Friday. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the Rea Valley Fire Department.

3. Provide to the Rea Valley Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The Rea Valley Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park.

2. Provide worker's compensation coverage for qualified, off -duty NPS employees who are members of the Rea Valley Fire Department and who respond to calls from the fire department for assistance within the Rea Valley Fire District or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the Rea Valley Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in anyone fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - TERM OF AGREEMENT

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - KEY OFFICIALS

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent, Buffalo National River
402 North Walnut St. Suite 136
Harrison, Arkansas 72601
(870) 741-5443

B. For the Rea Valley Fire Department:

Head of Fire Operations/Assistant Chief
Richard E. Beel
P.O. Box 913
Flippen, Arkansas 72634
(870) 453-8155 (Home)
(870) 449-4741 (Work)

ARTICLE VI - PRIOR APPROV AL

Not applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with the other final reports of incidents involving both parties.

ARTICLE VIII - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to t other shall remain the property of the furnishing party. Any property furnished by the NPS to Rea Valley Fire Department during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The Rea Valley Fire Department shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the Rea Valley Fire Department represents. No release of information relating to this agreement may state or imply that the Government approves of the Rea Valley Fire Department's work product or considers the Rea Valley Fire Department work product to be superior to other products or services.

C. Public Information Release

The Rea Valley Fire Department must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI - SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

Signature: /s/
Name:Ivan D. Miller
Title: Superintendent, Buffalo National-River
Date: 6/22/01

FOR THE REA VALLEY FIRE DEPARTMENT

Signature: /s/
Name: Richard E. Beel
Title: Head of Fire Operations/Assistant Chief
Date: 6/12/01

MEMORANDUM OF UNDERSTANDING FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

Memorandum of Understanding between the National Park Service and the JASPER Volunteer Fire Department

Agreement#G7150010001

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the Jasper VFD acting through its Chief. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfire and in conducting search and rescue operations on lands within the Park's boundaries, within the Jasper Fire District, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The Jasper Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the Town of Jasper and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § l856a (1994).

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the Jasper Fire Department, qualified, on-duty NPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the Town of Jasper or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement, NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m., Monday through Friday. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the Jasper Fire Department.

3. Provide to the Jasper Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The Jasper Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park.

2. Provide worker's compensation coverage for qualified, off -duty NPS employees who are members of the Jasper Fire Department and who respond to calls from the fire department for assistance within the Town of Jasper or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the Jasper Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in anyone fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - TERM OF AGREEMENT

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - KEY OFFICIALS

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent, Buffalo National River
402 North Walnut St. Suite 136
Harrison, Arkansas 72601

B. For the Jasper Fire Department:

Chief
Terry Brasel
HC 31 Box 215
Jasper, AR 72641

ARTICLE VI - PRIOR APPROV AL

Not applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with the other final reports of incidents involving both parties.

ARTICLE VIII - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to t other shall remain the property of the furnishing party. Any property furnished by the NPS to Jasper Fire Department during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take

affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The Jasper Fire Department shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the Jasper Fire Department represents. No release of information relating to this agreement may state or imply that the Government approves of the Jasper Fire Department's work product or considers the Jasper Fire Department work product to be superior to other products or services.

C. Public Information Release

The Jasper Fire Department must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI - SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

Signature: /s/
Name:Ivan D. Miller
Title: Superintendent, Buffalo National-River
Date: 6/22/01

FOR THE TOWN OF JASPER

Signature: /s/
Name: Shannon Willis
Title: Mayor
Date: 6/4/01

**MEMORANDUM OF
UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE
ASSISTANCE**

Agreement Number MU7150020002
Page 1 of 6

**Memorandum of Understanding
between the
National Park Service
and
Krooked Kreek Volunteer Fire Protection Association, Inc.**

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and Krooked Kreek Volunteer Fire Protection Association, Inc. acting through the President of the Board of Directors. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfires and in conducting search and rescue operations on lands within the Park's boundaries, within the Krooked Kreek Volunteer Fire Protection Association, Inc. district, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The Krooked Kreek Volunteer Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the Krooked Kreek Volunteer Fire Department's district and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE 11 - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § 1856a (1994).

MEMORANDUM OF UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the Krooked Kreek Volunteer Fire Department, qualified, on-dutyNPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the DISTRICT OF Krooked Kreek Volunteer Fire Department or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement,NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m., Monday through Friday. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the Krooked Kreek Volunteer Fire Department.

3. Provide to the Krooked Kreek Volunteer Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The Krooked Kreek Volunteer Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park.

2. Provide worker's compensation coverage for qualified, off-duty NPS employees who are members of the Krooked Kreek Volunteer Fire Department and who respond to calls from the fire department for assistance within the district of Krooked Kreek Volunteer Fire Department or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the Krooked Kreek Volunteer Fire Department's facilities and equipment.

MEMORANDUM OF UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in any one fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreeme

MEMORANDUM OF UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

ARTICLE IV - TERM OF AGREEMENT

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - KEY OFFICIALS

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent
Buffalo National River
402 North Walnut Suite 136
Harrison, AR 72601

B. For Krooked Kreek Volunteer Fire Protection Association, Inc.:

Fire Chief
Krooked Kreek Volunteer Fire Protection Association, Inc.
P.O. Box 2341
Harrison, AR 72602

ARTICLE VI - PRIOR APPROVAL

Not applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with each other final reports of incidents involving both parties.

ARTICLE V111 - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to the other shall remain the property of the furnishing party. Any property furnished by the NPS to the during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

MEMORANDUM OF UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice -.nd to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The Krooked Kreek Volunteer Fire Protection Association, Inc. shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which Krooked Kreek Volunteer Fire Protection Association, Inc. represents. No release of information relating to this agreement may state or imply that the Government approves of the Krooked Kreek Volunteer Fire Protection Association, Inc. work product or considers the Krooked Kreek Volunteer Fire Protection Association, Inc. work product to be superior to other products or services.

C. Public Information Release

The Krooked Kreek Volunteer Fire Protection Association, Inc. must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

MEMORANDUM OF UNDERSTANDING
FIREFIGHTINIG/SEARCH AND RESCUE ASSISTANCE

D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and' -.xpenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI -SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this agreement on the' date(s) set forth below.

FOR THE NATIONAL PARK SERVICE:

Signature: ___/s/ Ivan D. Miller_____

Name: _____

Title: _Supt._____

Date: __07/22/02_____

FOR KROOKED KREEK VOLUNTEER FIRE PROTECTION ASSOCIATION, INC.:

Signature: ___/s/ Garry Carlton_____

Name:_____

Title:____Fire Chief_____

Date:____07/17/02_____

Memorandum of Understanding
between the
National Park Service
and the
Morning Star Volunteer Fire Department

Agreement#G7150010003

ARTICLE I - Background and Objectives

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the Morning Star Volunteer Fire Department acting through its Fire Chief.

The purpose is for mutual assistance in preventing, detecting, and suppressing fires and in conducting search and rescue operations in the immediate areas of our joint boundaries.

ARTICLE II – Legislative Authority

This agreement is entered into under the authority of 42 U.S.C. § l856a (1994).

ARTICLE III - Statement of Work

A. The National Park Service will:

1. Furnish, when requested by the Morning Star Volunteer Fire Department, qualified, on-duty NPS employees to assist in the suppression of fires and search and rescue operations in the Morning Star area whenever the assistance does not seriously impact the conduct of Park business. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the Morning Star Volunteer Fire Department.

3. Provide to the Morning Star Volunteer Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The Morning Star Volunteer Fire Department will:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the joint suppression of fires and in search and rescue operations on federally owned land near the Morning Star response area.

2. Provide worker's compensation coverage for qualified, off -duty NPS employees who are members of the Morning Star Volunteer Fire Department and who respond to calls from the fire department.

3. Provide to the NPS an annual familiarization tour of the Morning Star Volunteer Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in anyone fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - Term of Agreement

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - Key Officials

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent, Buffalo National River
402 North Walnut St. Suite 136
Harrison, Arkansas 72601

B. For the Morning Star Fire Department:

Fire Chief, Morning Star Fire Department
HC 89, Box 193A
Marshall, AR 72650

ARTICLE VI - Prior Approval

Not applicable.

ARTICLE VII - Reports and/or Other Deliverables

Upon request and to the full extent permitted by applicable law, the parties shall share with the other final reports of incidents involving both parties.

ARTICLE VII - Property Utilization

Unless otherwise agreed to in writing by the parties, any property furnished by one party to t other shall remain the property of the furnishing party. Any property furnished by the NPS to Rea Valley Fire Department during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE VIII - Modification and Termination Clause

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably.

ARTICLE IX - Signatures

IN WITNESS HEREOF, the parties hereto have executed this understanding on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

Signature: /s/
Name:Ivan D. Miller
Title: Superintendent, Buffalo National-River
Date: 6/22/01

FOR THE MORNING STAR VOLUNTEER FIRE DEPARTMENT

Signature: /s/
Name: Zeb Horton, Title: Fire Chief
Date: 5/29/01

MEMORANDUM OF UNDERSTANDING FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

Agreement Number **G7150010006**

Memorandum of Understanding
between the
National Park Service
and the
PG&S Fire Department

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the PG&S Fire Department, acting through its Chief. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfires and in conducting search and rescue operations on lands within the Park's boundaries, within the PG&S Fire District, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The PG&S Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the District of PG&S and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § 1856a (1994).

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the PG&S Fire Department, qualified, on-duty NPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the District of PG&S or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement, NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m. Monday through Friday. Authorized, on-duty NPS employees shall be deemed acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty employees who respond to calls from the PG&S Fire Department.

3. Provide to the PG&S Fire Department an annual familiarization tour o Park's facilities, equipment, and access points.

B. The PG&S Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park

2. Provide worker's compensation coverage for qualified, off-duty NPS employees who are members of the PG&S Fire Department and who respond to calls from the fire department for assistance within the Town of Cheyenne or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the PG&S Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in any one fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - <u>TERM OF AGREEMENT</u>

This agreement shall be effective for a period of five years from the date of final signature unless it is terminated earlier by one of the parties pursuant to Article VIII that follows

ARTICLE V - KEY OFFICIALS

Communications and notices regarding this agreement shall be directed to the following key contacts for each party:

For the NPS:

Superintendent, Buffalo National River
402 North Walnut Street, Suite 136
Harrison, Arkansas 72601

For the PG&S Fire Department:

Chief Jerry D. Willis
P..0. Box 85
St. Joe, Arkansas 72675

ARTICLE VI - PRIOR APPROVAL

Not Applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

On request and to the full extent permitted by applicable law, the parties shall share with each other final reports of incidents involving both parties.

ARTICLE VIII - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to the other shall remain the property of the furnishing party. Any property furnished by the NPS to the Fire Department during the performance of this agreement shall be used and disposed of in accordance with the NPS Property Management Regulations.

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. **Civil Rights**

During the performance of this agreement, the participants agree to abide by the USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. **Promotions**

The PG&S Fire Department shall not publicize or otherwise circulate promotion material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of product, service, or position which the PG&S Fire Department represents. No release of information relating to this agreement may state or imply that the Government approves of the PG&S Fire Department's work product or considers the PG&S Fire Department's work product to be superior to other products or services.

C. **Public Information Release**

The PG&S Fire Department must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which to the Department of the Interior, any bureau, park unit, or employee (by name or tile) or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

D. **Liability Provision**

Each party to this agreement will indemnify, save and hold haIm1ess, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of; or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI – SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

/s/ Ivan D. Miller
Superintendent, Buffalo National River
7/20/01

FOR THE DISTRICT OF PG&S

/s/ Jerry D. Willis
Secretary-Treasurer, PG&S Fire Department
7/17/01

MEMORANDUM OF
UNDERSTANDING
FIREFIGHTING/SEARCH AND RESCUE
ASSISTANCE

Memorandum of Understanding
between the
National Park Service
and the
Ralph-Caney Rural Volunteer Fire Department

Agreement#MU7150050001

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the Ralph-Caney Rural VFD acting through its Chief. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfire and in conducting search and rescue operations on lands within the Park's boundaries, within the Ralph-Caney Rural Volunteer Fire District, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The Ralph-Caney Rural Volunteer Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the communities of Ralph and Caney and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § l856a (1994).

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the Ralph-Caney Rural Volunteer Fire Department, qualified, on-duty NPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the communities of Ralph-Caney or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement, NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m., Monday through Friday. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the Ralph-Caney Rural Volunteer Fire Department.

3. Provide to the Ralph-Caney Rural Volunteer Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The Ralph-Caney Rural Volunteer Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park.

2. Provide worker's compensation coverage for qualified, off -duty NPS employees who are members of the Ralph-Caney Rural Volunteer Fire Department and who respond to calls from the fire department for assistance within the communities of Ralph and Caney or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the Ralph-Caney Rural Volunteer Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in anyone fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - <u>TERM OF AGREEMENT</u>

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - KEY OFFICIALS

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent, Buffalo National River
402 North Walnut St. Suite 136
Harrison, Arkansas 72601

B. For the Ralph-Caney Rural Volunteer Fire Department:

Chief Wesley Shipman
P.O. Box 405
Summit, Arkansas 72677

ARTICLE VI - PRIOR APPROV AL

Not applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with the other final reports of incidents involving both parties.

ARTICLE VIII - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to t other shall remain the property of the furnishing party. Any property furnished by the NPS to Ralph-Caney Rural Volunteer Fire Department during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The Ralph-Caney Rural Volunteer Fire Department shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the Ralph-Caney Rural Volunteer Fire Department represents. No release of information relating to this agreement may state or imply that the Government approves of the Ralph-Caney Rural Volunteer Fire Department work product or considers the Ralph-Caney Rural Volunteer Fire Department work product to be superior to other products or services.

C. Public Information Release

The Ralph-Caney Rural Volunteer Fire Department must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI - SIGNATURES

IN WITNESS HEREOF, the parties hereto have executed this agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

Signature: /s/
Name:Ivan D. Miller
Title: Superintendent, Buffalo National-River
Date:

FOR THE COMMUNITIES OF RALPH AND CANEY:

Signature: /s/
Name: Viola Irene Wang
Title: Board Member
Date: 3/19/02

MEMORANDUM OF UNDERSTANDING FIREFIGHTING/SEARCH AND RESCUE ASSISTANCE

Memorandum of Understanding between the National Park Service and the HA-RO-CO Volunteer Fire Department

Agreement#G7150010002

ARTICLE I - BACKGROUND AND OBJECTIVES

This agreement is entered into by and between the National Park Service (hereinafter "NPS"), United States Department of the Interior, acting through the Superintendent of Buffalo National River (hereinafter "Park"), and the HA-RO-CO Fire Department acting through its Chief. The purpose of this agreement is to establish the terms and conditions under which the parties will provide mutual assistance in preventing, detecting, and suppressing structural fires and wildfire and in conducting search and rescue operations on lands within the Park's boundaries, within the HA-RO-CO Fire District, and in the immediate surrounding area.

Currently the NPS is primarily responsible for providing, through an interagency acquisition agreement with the Forest Service, United States Department of Agriculture, fire prevention, detection, and suppression and for conducting search and rescue operations on federally owned land within the Park. The HA-RO-CO Fire Department is primarily responsible for providing fire prevention, detection, and suppression and for conducting search and rescue operations within the Town of HAROCO and in the immediate surrounding area (including non-federally owned land within the Park's boundaries).

ARTICLE II - AUTHORITY

This agreement is entered into under the authority of 42 U.S.C. § l856a (1994).

ARTICLE III - STATEMENT WORK

A. The NPS agrees to,

1. Furnish, when requested by the HAROCO Fire Department, qualified, on-duty NPS employees to assist in the suppression of structural fires and wildfires and in search and rescue operations within the Town of HAROCO or in the immediate surrounding area whenever the furnishing of such assistance does not seriously impact the conduct of Park business. For purposes of interpreting this agreement, NPS employees are deemed to be "on duty" from 8:00 a.m. to 5:00 p.m., Monday through Friday. Authorized, on-duty NPS employees shall be deemed to be acting within the scope of their federal employment when responding to calls from the fire department.

2. Provide federal worker's compensation coverage for authorized, on-duty NPS employees who respond to calls from the HAROCO Fire Department.

3. Provide to the HAROCO Fire Department an annual familiarization tour of the Park's facilities, equipment, and access points.

B. The HAROCO Fire Department agrees to:

1. Furnish when requested by the NPS, available qualified personnel, fire equipment, and rescue equipment to assist in the suppression of structural fires and wildfires and in search and rescue operations on federally owned land within the Park.

2. Provide worker's compensation coverage for qualified, off -duty NPS employees who are members of the HAROCO Fire Department and who respond to calls from the fire department for assistance within the Town of HAROCO or in the surrounding area.

3. Provide to the NPS an annual familiarization tour of the HAROCO Fire Department's facilities and equipment.

C. The parties further agree as follows:

1. Each party shall provide to the other party a list of responsible persons, with telephone numbers, to be contacted in an emergency. At least once a year, or more often if necessary, each party shall provide the other party with an updated list of such persons and telephone numbers.

2. Each party shall provide to the other party copies of current fire management plans for their areas of primary responsibility, including maps of areas involved and descriptions of special or extraordinary actions to be taken.

3. Only Minimum Impact Suppression Tactics shall be used when fighting fires within the Park. No chainsaws or ground-disturbing equipment such as graders or bulldozers shall be used without the permission of the NPS Superintendent or his/her designee.

4. After notifying the other party of a fire's discovery, either party may take immediate action to suppress a fire in the other party's area of primary responsibility in order to save life or property.

5. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

6. Neither party to this agreement shall reimburse the other party for all or any part of the cost incurred by such party in providing fire protection pursuant to this agreement.

7. Nothing in this agreement shall be construed as obligating the NPS to expend in anyone fiscal year any sum in excess of the monies appropriated by Congress and allocated by the NPS for the performance of this agreement.

ARTICLE IV - TERM OF AGREEMENT

This agreement shall be effective for a period of five years from the date of final signature, unless it is terminated earlier by one of the parties pursuant to Article VIII that follows.

ARTICLE V - KEY OFFICIALS

All communications and notices regarding this agreement shall be directed to the following key official(s) for each party:

A. For the NPS:

Superintendent, Buffalo National River
402 North Walnut St. Suite 136
Harrison, Arkansas 72601

B. For the HAROCO Fire Department:

Chief
Jeff Still
HC 80 Box 272A
Harriet, AR 72639

ARTICLE VI - PRIOR APPROV AL

Not applicable.

ARTICLE VII - REPORTS AND/OR OTHER DELIVERABLES

Upon request and to the full extent permitted by applicable law, the parties shall share with the other final reports of incidents involving both parties.

ARTICLE VIII - PROPERTY UTILIZATION

Unless otherwise agreed to in writing by the parties, any property furnished by one party to t other shall remain the property of the furnishing party. Any property furnished by the NPS to HAROCO Fire Department during the performance of this agreement shall be used and disposed of as set forth in the NPS Property Management Regulations.

ARTICLE IX - MODIFICATION AND TERMINATION

A. This agreement may be modified only by a written instrument executed by the parties.

B. Either party may terminate this agreement by providing the other party with sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X - STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any

person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The HAROCO Fire Department shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the HAROCO Fire Department represents. No release of information relating to this agreement may state or imply that the Government approves of the HAROCO Fire Department's work product or considers the HAROCO Fire Department work product to be superior to other products or services.

C. Public Information Release

The HAROCO Fire Department must obtain prior Government approval from the Superintendent of Buffalo National River for any public information release which refers to the Department of the Interior, any bureau, park unit, or employee (by name or title), or to this agreement. The specific text, layout, photographs, etc. of the proposed release must be submitted with the request for approval.

D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI - <u>SIGNATURES</u>

IN WITNESS HEREOF, the parties hereto have executed this agreement on the date(s) set forth below.

FOR THE NATIONAL PARK SERVICE

Signature: /s/
Name:Ivan D. Miller
Title: Superintendent, Buffalo National-River
Date: 6/22/01

FOR THE TOWN OF HA RO CO (Harriet, Rock Creek and Cozahome)

Signature: /s/
Name: Jeff Still
Title: Fire Chief
Date: 6/5/01

1443MU715090001

MEMORADUM OF UNDERST A1'\TDING
BETWEEN THE NATIONAL PARK SERVICE
AND ARKANSAS FORESTRY COMMISSION

This **Memorandum of Understanding**, made and entered into by and between the State Forester of Arkansas for and in behalf of the Arkansas Forestry Commission, hereinafter called the State, and Superintendent of Buffalo National River, for and in behalf of the United States Department of the Interior, National Park Service, hereinafter called the Service, under the authority granted the Superintendent in 16 U.S.C. § 1b, 16 U.S.C. § 460m-8 and 42 U.S.C. § 1856 et seq.
WITNESSETH,

ARTICLE I.

WHEREAS, the State is responsible for suppression of wildfires on privately owned land in and surrounding the boundaries of the National River; and

WHEREAS, the Service is responsible for suppression of wildfires on federally owned lands within the boundaries of the Buffalo National River; and

WHEREAS, the parties hereto are desirous of cooperating for the purpose of suppressing all wildfires on intermingled State and Service lands within the National River boundaries; and

WHEREAS, wildfires occurring on lands administered by either agency constitute a threat to adjacent lands of the other agency; and

WHEREAS, it is to the mutual advantage of the State and the Service to cooperate closely in the suppression of wildfires and fire prevention; and

WHEREAS, the State is the major wildfire fighting agency having coverage of lands adjacent to the National River.

ARTICLE II.

NOW, THEREFORE, IT IS MUTUALLY AGREED THAT:

1. The Service will make initial attack and attempt to suppress all fires on Service owned lands and private lands within ½-mile of the Service's boundary which pose a threat to Service land. The State may provide, if requested, crew, equipment and reinforcements needed to control wildfires occurring on Service lands. Each agency will forward reports they receive of fires involving lands under the other's jurisdiction.

2. The Service will assist the State with fire suppression activities outside the Park and 1/2-mile protection zone during periods of extreme fire emergencies. Request for use of Service personnel and equipment must be made through the Superintendent.

3. The State and the Service consider fire prevention as a beneficial endeavor. Wildfire prevention programs shall be coordinated to complement and reinforce individual agency and joint programs of fire prevention in North Central Arkansas.

4. Each and every provision of this Memorandum of Agreement is subject to the laws of the United States, the laws of the State of Arkansas, and all lawful rules and regulations promulgated thereunder, and shall be interpreted accordingly.

5. Nothing in this Memorandum of Agreement shall be construed as obligating either party hereto to the expenditure of funds or the future payment of money in excess of appropriations authorized by law.

6. Nothing contained herein shall be construed as limiting in any way the responsibility and authority as defined by law, of the Superintendent, Buffalo National River, and the State Forester, Arkansas Forestry Commission, in connection with the administration and protection of lands and resources under their respective administrations.

7. The Service and the State shall not be liable, one to the other, for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement. It is agreed by the parties hereto that each agency will be solely responsible for the acts and omissions of its officers and employees resulting in damage to property or injury to their parties to the same extent as each agency is presently responsible under applicable laws and regulations.

8. It is understood that for purposes of Federal employees' compensation coverage, employees of the Federal government assisting in suppressing fires on State or private lands within or adjacent to the Park are to be considered employees of the Federal Government and not the State Government.

9. It is understood that for purposes of State employees' compensation coverage, employees of the State Government assisting in suppressing fires on Park lands are to be considered as employees of the State Government and not the Federal Government.

ARTICLE III.

This Memorandum of Agreement will run for a period of five years. Parties to this agreement will reassess the benefits that have accrued and determine if they should reaffirm this Memorandum prior to the expiration date.

ARTICLE IV.

The agency officials instrumental to the administration of this cooperative agreement including approving, reaffirming or termination of this agreement will be the Superintendent of Buffalo National River for the National Park Service and the State Forester for the Arkansas Forestry Commission.

ARTICLE V.

1. The State and Service shall meet once annually, prior to the fall fire season to prepare and/or revise a written "Annual Action Plan" which will be attached to and made part of this agreement, and to discuss the previous fire season's activities, determine future needs, and to discuss fire prevention programs, and to arrange for necessary joint meetings of field personnel. Specific plans, and reporting procedures, communications and other related details shall be spelled out in the plan.

2. For statistical reporting of fires:

a. The State will report all fires that burn on private lands, within the authorized boundary of the National River.

b. The Service will report all fires that burn on federally owned lands within the National River.

c. The State will forward all fire report data on federally owned lands to the Service on State Form 2410.1 to Buffalo National River, P .O .Box 1173, Harrison, Arkansas, 72602-1173, so they can report the statistical fire. If the Service puts out any fires on State lands, they will forward a Form DI-1202 to the appropriate area District Forester for the same purpose.

d. Courtesy copies of other fires within the authorized boundary of the National River, that are the other agency's statistical fires, should be sent to the appropriate State District Forester or the Fire Management Officer, at Harrison for information purposes.

3. The Service will provide updated data to the State on federal ownership within the authorized boundary as land acquisition continues, so that m the State can be kept current.

ARTICLE VI.

Either party may terminate the understanding by providing 45 days advance notice to the other party.

ARTICLE VII

1. During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination and will not discriminate person because of race, color, religion, sex or national origin. The participants will take action to ensure that applicants are employed without regard to their race, color, religion, sex or national origin.

2. No member or delegate to Congress, ore resident Commissioner, shall be admitted or part of this agreement, or to any benefit that may arise therefrom, but this provision construed to extend to this agreement if made with a corporation for its general benefit.

3. Arkansas Forestry Commission shall not publicize, or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures manuscripts or other publications) which states or implies Governmental, Department, bureau or Government employee endorsement of a product, service, or position which the Arkansas Forestry Commission represents. No release of information relating to this agreement may state or imply that the Government approves of the Arkansas Forestry Commission’s work product, or the Arkansas Forestry Commission’s work product to be superior to other products or services.

4. Arkansas Forestry Commission must obtain prior Government approval from Buffalo River for any public information releases which refer to the Department of the Interior, park unit, or employee (by name or title), or this agreement. The specific text, layout, photographs etc., of the proposed release must be submitted with the request for approval.

ARTICLE VIII

IN WITNESSETH WHEREOF, the parties hereto have executed this Memorandum of Agreement as of the date last signed below.

National Park Service

Dated: 11/8/99 By: John Linehan
Superintendent
Buffalo National River

State of Arkansas
Arkansas Forestry Commission

Dated: 10/4/99 By John Shannon

APPENDIX E

4. Sample Delegation of Authority

Buffalo National River
Harrison, AR

Delegation of Authority

As of 1800, May 20, 2001, I have delegated authority to manage the Pruitt 1 fire, number 0102, Buffalo National River, to Incident Commander, John Doe and his Incident Management Team.

The fire which originated as an arson fire on May 18, 2001, is burning in habitat adjacent to the River boundary. My considerations for management of this fire are:

1. Provide for firefighter safety.

2. I would like the fire managed in such a manner that suppression actions will cause little environmental damage as possible.

3. Key features requiring priority protection are: adjacent private lands, campground, and NPS infrastructure.

4. Key resource considerations are: protecting bluffs adjacent to the river.

5. Restrictions for suppression actions are no tracked vehicles in the area of the bluffs or river bottom will be utilized.

6. Minimum tools for use are Type II/III helicopters, and chainsaws.

7. My agency advisor will be park Fire Management Officer, James Mattingly.

8. Managing the fire cost-effectively for the values at risk is a significant concern.

9. Providing training opportunities for River personnel is requested to strengthen our organizational capabilities.

Superintendent, Buffalo National River
May 20, 2001

APPENDIX F

F. WILDLAND AND PRESCRIBED FIRE MONITORING PLAN

DRAFT BUFFALO NATIONAL RIVER FIRE MONITORING PLAN

I: *INTRODUCTION:*

Buffalo National River has an active prescribed and wildland fire use program within the Division of Resource Management. The program has fire responsibility for the Arkansas "Group" parks (PERI,ARPO,HOSP,FOSM) as well as the national river's own fire program. Since 1993 park staff has pursued the use of prescribed fire within historic zones, open fields, native grass ecosystems including glades and savannas. Hazard fuel reduction and wildland fire suppression have been an active program since the park's establishment in 1972.

A. Relationship to planning documents:

The Master Plan for Buffalo National River speaks to the need for "openings cut by the river, man, or fire" as providing the edge habitat for animal activity and wildlife observation. It also addresses the need to know the "..nature of plant succession in the area, role of fire…" which points to the need to monitor fire effects to assure these needs are met. (NPS 1977)

The Fire Management Plan for Buffalo National River, completed in 1988, echoes the monitoring concerns stated in the Master Plan to "…fully understand the interrelationship of fire with Buffalo River flora….". (NPS 1988) and the approved Resource Management Plan (RMP) goals and objectives to "Manage for the perpetuation of natural and cultural resources…", "Inventory and monitor park resources", and maintain open fields. The RMP also directs the park to identify specific areas to be maintained …(by prescribed fire) and to attempt to restore a pre-settlement landscape diversity and associated native plant communities.

This same Fire management Plan identifies six major vegetative forest associations and addresses their response to fire. A larger grouping of these associations into fire intolerant, fire tolerant and fire dependant marks the first division.

1. Fire intolerant grouping include floodplain or bottomland where fire is excluded by virtue of the high moisture environment. Major tree species include American elm, green ash, silver maple, box elder, sycamore, river birch, black willow, cottonwood, and sweetgum. Beech forest with American beech, red maple, and American basswood form another less common association.

2. Fire tolerant grouping contains the mixed hardwood as a transition zone between the floodplain and the more fire tolerant oak-hickory forest. Major species include white ash, butternut hickory, hackberry, blackgum, black walnut and various oaks. The oak-hickory is more tolerant and is the most extensive within the park. Found on the dry north to south facing slopes the more common species are the post oak, blackjack oak, black oak, and mockernut hickory. The Fire Management Plan also discusses a range of specific tolerance for the various species.

3. Fire dependent associations are the oak-pine dominated by the short-leaf pine. These are found in scattered patches throughout the park. The role of fire in pine regeneration is well documented in the plan and elsewhere in the literature. Within the fire dependant communities is also the cedar-glade association found on bluffs and steep slopes of limestone and some dolomite. While the red cedar may predominate as the tree species understory grass species include big bluestem, little bluestem, Indian grass and switch grass. These areas are scattered throughout the park and the role of fire in the preservation of these communities is also well documented within the literature. The existing open field associations and their perpetuation by fire is also a point of discussion within the plan.

During a recent meeting (2000) to initiate the frame work for a Fire Monitoring Plan with park staff, the Midwest region fire ecologist, and Ozark National Scenic Riverways fire monitoring leader the following associations were agreed upon as being the focal point of prescribed fire efforts within Buffalo National River. The species description of these following associations would mirror and expand on the Fire Management Plan discussion with the exception of the additions of cane communities and open fields. The ecotypes selected for monitoring contain additional discussions of fire's role in these ecosystems and combinations of the Fire Management Plan's groupings.

II. *PARK ECOLOGY*:

A. Glades, Glade/forest transition/post oak barrens

General descriptions of the vegetation allow for comparisons within the Ozark Highlands between the Missouri Ozarks and the Buffalo National River. Historically, evidence points to the "Ozark forest included both open, park-like stands and dense forest cover. The open park-like stands had little understory and a dense herbaceous ground flora of prairie grasses and wild flowers. Both openness and the abundance of prairie herbs suggest that periodic fire, and to a lesser extent grazing by bison and elk, were important processes in the pre-settlement landscape." Additionally many unusual communities, both terrestrial and aquatic, are endemic to the Ozarks. The most extensive glades in the Midwest are found in the Ozarks as well as the largest savanna and forested landscapes. (Missouri Biodiversity task Force 1992)

The glades of Buffalo are small and predominantly on sedimentary (limestone) substrates. (Hinterthuer 1977)(Logan 1992). Generally, the glades are dominated by grasses, including little bluestem (Andropogon scoparius), and indian grass (Sorghastrum nutans) with a rich mixture of forbs. The glades are surrounded by woodlands dominated by white oak (Quercus alba), northern red oak (Q. rubra) and shortleaf pine (Pinus echinata) interspersed with remnant post-oak (Q. stellata) savannas. (Willson 1997) Such savannas are grasslands interspersed with trees and maintained by fire. They are usually distinguished by a tree canopy cover of 10 to 50 percent, the almost complete absence of a shrub layer, and the dominance of prairie grasses and herbs. (Iffrig and Nelson 1983, R.C. Anderson 1982) Other differentiating characteristics are identified by Logan describing ozark glades as an opening with shallow soils or bare rock in an otherwise forested landscape while differentiating savanna by substrate, topography, extensiveness and structural vegetative differences. (Logan 1992)

Among this vegetation the most dynamic points in the terrestrial ecosystems are the transition zones between forest and glades. In many cases these transitions were formerly species-rich savanna/woodlands. Soil depth, climate, and fire (reviewed by Ladd 1991) probably shaped the gradual ecotone between glade and forest, but with fire suppression of the last 50-100 years, the character of the transition zone appears to have radically changed (Reiter 1991).

A 1991 site report by the Arkansas Natural Heritage identified an approximately 1000 acre post oak savanna or barrens within the Turkey Mountain area of the Lower Buffalo Wilderness as unique to the state and "presumably degraded through protection from fire". (Foti 1991) The term "barrens" as it appears in historical surveyor's notes was used to describe thin, poor, or rocky soil unable to grow trees in the Ozarks. (Schroeder 1981)
According to Logan 1992 this area is "unlike any of the glade sites of the Buffalo River". Foti (unpublished) states the area appears to fit the Nelson (1985) classification of limestone/dolomite savanna and is the first example of this community type found in Arkansas.

B. Forest oak/dry woodland

The vegetation of the river is mostly upland forest with the predominant type being the oak-hickory. Typically the predominant species would be white oak (Quercus alba), black oak (Q. velutina), white hickory (Carya tomentosa) and sweet gum (Liquidambar styraciflua). Some differences may be on cool moist site dominated by beech (Fragus grandifolia) or dryer sites with post oak (Q. stellata) and blackjack (Q. marilandica). South facing slopes may be dominated by shortleaf pine (Pinus echinata) and species

such as red cedar (Juniperus virginiana) and honey locust (Gleditsia triacanthos) may be present in areas recently cleared or having experienced an absence of fire. (Johnson and Schnell 1988)

C. Open fields

Old field sites are heavily dominated by fescue (Festuca arundinacea), sericea lespedeza (Lespedeza cuneata) and bluegrass (Poa pratensis). (Johnson and Schnell 1988) Beginning in 1995 the park undertook a program to identify and manage field openings through a combination of prescribed fire, native grass restoration, and mechanical treatment. During 1999 fifty-eight of the 125 identified openings along the river corridor were qualitatively surveyed for vegetation. Twenty-nine of the units contained little bluestem and it was found to be the dominant or subdominant species within 5 of the units. Additionally, seven of the units were found to have "glade-like" qualities and the final recommendation of the survey was for "controlled burns for all of those fields surveyed" (Logan 1999).

D. Cane communities

The Ecological Society of America's recent report on endangered ecosystems listed southeastern canebrakes as one of America's most critically endangered natural communities, suffering a decline of 98% of its' ecological structure since European settlement. (Fulcher pers communication) The role of canebrakes in the southeast and other areas such as Missouri for habitat of species in decline such as the Swainson's Warbler is well documented in the literature. (Thomas 1996) Decline of this ecosystem is related to altered burning regimes and historic accounts of canebrakes in Arkansas can be traced from 1749 though the 1850s. Studies have found that frequent burning of southern canebrakes results in decline whereas burning every 7-10 years favors the community. (Platt 1997)

III. *MANAGEMENT OBJECTIVES*:

General: Provide a better understanding of the effect of prescribed fire in accomplishing management goals designed to protect and preserve field openings, glades, and post oak barrens (savanna) remnants.

A. Constraints:

The role of fire along with climate and humans interacting to produce landscape scale changes in vegetation (Guyette and Dey 1997), soils, and watersheds is well documented.
Fire history studies within Buffalo National River by Johnson and Schnell in 1985 found fire return intervals averaging 9.2 year for the period of 1880 to 1973. Since 1973 it has increased greatly to more than 60 years. A 60 year fire return interval would probably result in a change in tree species composition over a long period of time. The same study concluded with the recommendation for "a program of prescribed burning…including long-term monitoring of vegetation changes…" (Johnson 1985)

Previous work by Jenkins et al.(1997) has led the way in providing a better understanding of both the protohistoric fire regime and the effects of fire suppression within the post oak barrens remnant in Buffalo National River. Data from 18 plots identified 254 species and showed that limestone glades with shallow soil had the highest diversity while sites with deeper acid soils and a high woody basal area (due to post fire regeneration of black hickory and black jack oak) had the lowest diversity. A fire history from that same study indicated a fire return interval of 5.7 years for the past 225 years.

B. Level 1 monitoring: BUFF will use monitoring design outlined in the NPS National Fire Monitoring Handbook

C. Level 2 monitoring: BUFF will use monitoring design outlined in the NPS National Fire Monitoring Handbook

D. Specific objectives: level 3 and level 4 monitoring:

1. Glades, Glade/forest transition/post oak barrens – Scheduled for FY 2001. The park will focus on reconnaissance for areas with least cedar or mechanical thinning, windrow & burn to establish monitoring plots. We will target the transition zones adjacent to cedar glades and establish permanent plots within additional post oak barrens areas.

- herbaceous layer – increase cover of native species by 40% after 10 years of burning level 3
- reduce stem density by 60% after 10 years of burning (level 3 short term)
- reduce new growth eastern red cedar by 95% (level 4 long term) after three consecutive burns

2. Forest oak/dry woodland – Scheduled for FY2002 establish permanent plots

- reduce tree density to open vista with a target density of 30-50 trees/acre after 20 years – level 4 long term
- reduce stem density by 60% after 10 years of burning level 3
- reduction reduce live stems/ac by 60 % over 10 years of burning level 3

3. Open fields

a. wildlife – Maintain/restore/intro native grass species
- Increase percent cover of native species by 25% after three prescribed burn applications level 3

b. cultural/historic - Maintain historical farmstead openings Scheduled FY 2003
- establish monitoring photopoints
- maintain woody species density at 90% of preburn level within open fields over 10 years of burning level 3

4. Cane communities – Maintain or increase cane community size Scheduled FY 2003

– maintain edge effect of cane community within 100% or more of preburn cover level 3
– encourage nesting for neotropical migrants (Swainsons)

IV *MONITORING DESIGN and OBJECTIVES*:

A. Monitoring objectives - Glade Transition/Post oak Barrens:

We want to be 90% sure of detecting an increase in 40% of the cover values for native species after 10 years. Based on this long term data set we are willing to accept a 10% chance of saying that such changes took place when it did not. We want to be 80% sure of detecting a decrease in density of 60% of pole size trees over the next ten years and are willing to accept a 20% chance of saying such changes took place when it did not. We also we to be 90% sure of a 95% reduction of new growth eastern red cedar after three consecutive burning events. We will accept a 10% chance of saying such changes took place when they did not.

FMH-4 MONITORING TYPE DESCRIPTION SHEET PARK: BUFF

MONITORING TYPE CODE: F S C S C 1 D 0 2 Date Described:

Monitoring Type Name: *Schizachyrium scoparium* **Glade Transition/Post oak barrens**
Preparers: G. Oviatt, S. Lail, J Mattingly, R. Klein,

Burn Prescription: These units will initially be burned in the spring, between approximately February 15 and April 15 (into green-up). Most units will be burned 2-3 times within the first ten years. Future bums (following the initial bum) may be conducted in the spring or fall. The units should be burned under moderate conditions that produce fire severity low enough to retain overstory trees, but high enough to meet stated objectives and minimizes smoke impacts. Temperatures typically range from 30-80°F; Relative humidities 25-50%: Midflame wind speed 2-15 mph; 1-hour fuel moisture 5-20%; 10-hour fuel moisture 10-20%.

Burn Goals: Decrease the density of seedling and pole trees greater than 1.4m in height and less than 10 cm DBH. Increase the cover and frequency of native herbaceous species while maintaining or increasing the number of native species. Reduce coverage and loading of fine fuels (hardwood litter) in overgrown glade units and all transitions.

Monitoring Type Variable(s): Density of seedling and pole trees. Total cover and frequency of native grasses and forbs. Number and percent of native herbaceous species.

Physical Description: Gentle to steep summits, backslopes, benches, and variable soil depth units. Aspects may be any or all but are predominantly south and west (135-315°). This type is typically found on exposed, variable-depth units over sedimentary limestone. This type will often have patches of exposed bedrock or variously sized boulders.

Biological Description: Glades are mid-grass/herbaceous dominated openings surrounded by, and often forming a mosaic with, various forms of woodlands and forests. Limestone/dolomite savanna (post oak barrens) are also mid-grass openings with *Quercus stellata (post* oak*),* as the dominant tree species. Transition is comprised of patches with some degree of wooded overstory immediately adjacent to glade openings. Transition woodlands are characterized by a short, sparse canopy of overstory or understory woody species over sparse to dense grass/herbaceous ground cover. Unburned open- glades and transition woodlands are often overgrown and have high densities of pole and seedling trees. Dominant species of open glades include *Schizachyrium scoparium* (little bluestem), *Andropogon gerardii* (big bluestem), *Sorghastrum nutans (Indian grass), Panicurn virgatum* (switch grass), *Rudbeckia spp.*, *Liatris spp. (blazing* star), and many others. Associated trees of transition include *Quercus stellata (post* oak), *Juniperus virginiana (eastern red cedar), Ulmus alata g* (winged elm), *Rhus copallina* (winged sumac), *Quercus muhlenbergii* (chinquapin oak), *Quercus marilandica* (blackjack oak), and others. Mosses and lichens are often conspicuous over exposed rock.
Rejection Criteria: Exclude anomalous vegetation patches, monitoring type boundaries, and barren areas (>35% cover by rock). Also reject areas within 30 meters of any physical barriers such as roads, trails, or streams. Reject plots that are less than 80% within either open glade or transition woodland. For example, plots 100% open glade or 100% transition are fine. Plots 50°4 open glade & 50% transition would be rejected.

B. Monitoring objectives - Forest oak/dry woodland:

We want to be 80% sure of reducing tree density to 30 tree/acre after 20 years. Based on this long term data set we are willing to accept a 20% chance of saying that such changes took place when it did not. We want to be 80% sure of detecting a decrease in 60% of pole size trees over the next ten years and are willing to accept a 20% chance of saying such changes took place when it did not. We also we to be 90% sure of a 60% reduction of live stems per acre over 10 years of burning. We will accept a 10% chance of saying such changes took place when they did not.

FMH-4 MONITORING TYPE DESCRIPTION SHEET PARK: BUFF

MONITORING TYPE CODE: F Q U V E I D 0 9 Date Described:

Monitoring Type Name: Quercus alba **Forest Oak/ Dry Woodland**

Preparers: G. Oviatt, S. Lail, J Mattingly, R. Klein

Burn Prescription: These units will initially be burned in the spring, between approximately February 15 and April 15 (into green-up). Most units will be burned 2-3 times within the first ten years. Future bums (following the initial bum) may be conducted in the spring or fall. The units should be burned under moderate conditions
that produce fire severity low enough to retain overstory trees, but high enough to meet stated objectives and minimizes smoke impacts. Temperatures typically range from 30-80° F; Relative humidities 25-50%: Midflame windspeed 2-15 mph; 1-hour fuel moisture 5-20%; 10-hour fuel moisture 10-20%.

Burn Goals: Reduce coverage and loading of fine fuels (hardwood litter). Increase the cover and frequency of native herbaceous species while maintaining or increasing the number of native species. Decrease the density of seedling and pole trees greater than 1.4m in height and less than 10cm DBH

Monitoring Type Variable(s): Density of seedling and pole trees. Total cover and frequency of native grasses and forbs. Number and percent of native herbaceous species.

Physical Description: Gentle to moderately steep summits, shoulder ridges, shoulders, and backslopes. Aspects may be any but are predominantly south and west (135-315°). This type is typically on exposed upper slopes and summits overlaying Everton and Boone formations. Soils are rapidly draining with frequent occurrence of chert gravel or boulders at or near the surface.

Biological Description: Open to closed (60-90% cover) canopy oak, oak-hickory, oak-pine, oak-cedar, or pine woodlands. The canopy is typically short in stature (50-75') and dominants include predominant species would be white oak (Quercus alba), black oak (Q. velutina), white hickory (Carya tomentosa) and sweet gum (Liquidambar styraciflua) *Quercus stellata (post* oak), *Pinus echinata* (shortleaf pine), and *Carya* spp. (hickory). The subcanopy is short (5-15'), poorly developed (<50% cover), and often *consists of Amelanchier arborea* (serviceberry) and *Cornus florida* (dogwood). Brush is often conspicuous and includes species such as *Vaccinium* spp. (blueberry) and *Rhus aromatica* (fragrant sumac). Herbaceous cover is sparse (<20%) and includes *Pteridium aquilinum* (bracken fern), *Desmodium* and *Lespedeza* spp. (bush clover). Mosses and lichens are often conspicuous on rock or bare soil. Ground surface is typically dominated by hardwood and/or pine litter.

Rejection Criteria: Exclude anomalous vegetation patches, monitoring type boundaries, and barren areas (>20% cover by rock). Also reject areas within 30 meters of any physical barriers such as roads, trails, or streams.

C. Monitoring objectives - Open fields/cane communities:

We want to be 80% sure of increasing the percent cover of native species by 25% after three fire applications. Based on this long term data set we are willing to accept a 20% chance of saying that such changes took place when it did not. We want to be 80% sure of maintaining a woody species density at 90% of the preburn level after 10 years of burning and are willing to accept a 20% chance of saying such changes took place when it did not. We also want to be 90% sure of maintaining or increasing the size of the cane community after ten years of burning. We will accept a 10% chance of saying such changes took place when they did not.

FMH-4 MONITORING TYPE DESCRIPTION SHEET PARK: BUFF

MONITORING TYPE CODE: GFEAR D 01 Date Described:
Monitoring Type Name: fescue (Festuca arundinacea), **Open fields**
Preparers: G. Oviatt, S. Lail, J Mattingly, R. Klein

Burn Prescription: These units will initially be burned in the spring, between approximately February 15 and April 15 (into green-up). Most units will be burned 2-3 times within the first ten years. Future bums (following the initial bum) may be conducted in the spring or fall. The units should be burned under moderate conditions.
Temperatures typically range from 30-80° F; Relative humidities 25-50%: Midflame windspeed 2-15 mph; 1-hour fuel moisture 5-20%; 10-hour fuel moisture 10-20%.

Burn Goals: Reduce coverage and loading of fine fuels (hardwood litter). Increase the cover and frequency of native herbaceous species while maintaining or increasing the number of native species. Decrease the density of seedling and pole trees greater than 1.4m in height and less than 10cm DBH

Monitoring Type Variable(s): Total cover and frequency of native grasses and forbs. Number and percent of native herbaceous species.

Physical Description: Gentle to gradual slopes adjacent to river or close to river bottoms. Upland sites are generally thin soils with soil texture ranging from sandy to a clay or gravel texture. Lowland sites have deep, well drained sandy soils, dense vegetation and noticeable moisture gradients.

Biological Description: Open (90% cover) with fescue (Festuca arundinacea), sericea lespedeza (Lespedeza capitata), bluegrass (Poa pratensis), or wingstem (Verbesina virginica) as the dominant or codominate species. Twenty-five percent of the fields examined had a strong little bluestem (Schizachyrium scoparium) component. Several wooded community types were also present including a riparian community dominated by box elder (Acer negrundo) and a dry woods community containing winged elm (Ulmus alata) and other species. Dense thickets of rivercane were found adjacent to the riparian area and in association with many open fields.

Rejection Criteria: Exclude anomalous vegetation patches, monitoring type boundaries, and barren areas (>20% cover by rock). Also reject areas within 30 meters of any physical barriers such as roads, trails, or streams.

V. *MONITORING IMPLEMENTATION SCHEDULE*:

See attached xls file – this will be inserted as part of final plan

VI. *DATA SHEET EXAMPLES*

VII. *RESPONSIBLE PARTY*

This Monitoring Plan was developed by the Division of Resource Management for Buffalo National River and the Fire effects Monitoring Specialist for Ozark National Scenic Riverways

VIII. *FUNDING NEEDS ASSESSMENT*

FIREPRO funding will be used for all monitoring activities. Additional funding will be sought from the Biological Resources Division, Northern Prairie Research center, National Park Service.

IX. *MANAGEMENT IMPLICATIONS OF POTENTIAL RESULTS*:

The fire dependent nature of the ecosystems and sites identified for fire monitoring is well documented within the literature as well as park specific references. The effects of the absence of fire within these ecosystems is equally well documented. (Foti 1991, Jenkins 1997, Johnson 1988,Logan 1992,1999) Confirming the role of prescribed fire applications through monitoring within these areas can allow management to approximate the effects of historic fire regimes and restore the balance to these dependant ecosystems. The loss or reduction of many critical natural areas, such as the post oak barrens, will be prevented by preventing or reducing the intrusion of species such as the eastern red cedar which invade in the absence of fire. Monitoring will provide information to park staff on the reduction in the density of forest cover and the subsequent increase of habitats such as cedar thicket through fire application. Scenic vistas and bird foraging will be protected or increased.

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XI. *CONSULTATION*

Douglas Ladd, The Nature Conservancy, St. Louis, Missouri
Jim DeCoster, Regional Fire Ecologist, National Park Service
Mark Baron, Wildlife Biologist, Arkansas Game and Fish Commission

XII. *REVIEWERS*

XII. *APPENDIX*

A. Plant specimen voucher collection/plant list
B. Vegetation map (under development)
C. Fire Management unit map (under development)
D. Fuel Model Map (under development)
E. Plot Location Map

APPENDIX G

G. PRE-ATTACK PLAN

Table 4 – Pre-Attack Plan

Function/Item	Available	Needed	Not Needed
Command			
Pre-attack WFSA			
Pre-positioning Needs			
Draft Delegation of Authority	X		
Management Constraints	X		
Interagency Agreements	X		
Evacuation Procedures			
Structural Protection Needs	X		
Closure Procedures			
Operations			
Water Sources	X		
Control Line Locations			
Natural Barriers	X		
Safety Zones			
Flight Routes/Restrictions			
Staging Area Locations	X		
Helispot/Helibase Locations			
Logistics			
ICP Location	X		
Roads/Trails with Limitations	X		
Utilities	X		
Medical Facilities	X		
Stores/Restaurants/Services	X		
Rental Equipment Sources			
Construction Contractors			
Sanitary Facilities	X		
Law Enforcement/Fire Departments	X		
Communications (availability)			
Maintenance Facilities			
Sanitary Landfills	X		
Planning			
Park Base Map	X		
Area Topographic Maps	X		
Infrared Imagery			
Vegetation/Fuel Maps	X		
Hazard Maps (ground and aerial)			
Special Visitor Use Areas			
Land Ownership Status			
Cultural Resource Maps	X		
Sensitive Plant Area Maps			

APPENDIX H

H. STEP-UP PLAN

Table 5 – Step-up Plan

Staffing Class	Fuel Model	Burning Index	Step up Actions
SC-1	L E R	0-7 0-7 0-3	Park will continue with normal operations
SC-2	L E R	8-16 8-16 4-7	Park will continue with normal operations
SC-3	L E R	17-34 17-33 8-16	Actions in SC-2 plus District supervisors will know the location and availability of their fire qualified personnel. Equip all vehicles with fire suppression tools. Current fire weather forecasts will be broadcast park-wide daily.
SC-4	L E R	35-47 34-41 17-20	Actions in SC-3 plus FMO may request emergency preparedness account from region. FMO may meet with the Superintendent, Chief of Resource Management and concerned agency representatives to coordinate resource needs. Implement the fire prevention program as defined in Fire Prevention Plan. Coordinate aerial detection with the USFS and AFC. Option to rent an Office of Aircraft Services (OAS) approved aircraft with approved pilot for a daily flight of River area. Selected personnel may be put on standby status at selected staging areas. Single Resource Patrols will be initiated to increase wildland fire detection and to deter arson ignitions. Will assign a dispatcher on any wildland fire. May supplement park personnel with outside overhead, crews and equipment as wildland fire occurrence increases.

Staffing Class	Fuel Model	Burning Index	Step up Actions
			Current fire weather forecasts will be broadcast park-wide daily.
SC-5	L E R	48+ 42+ 21+	Actions in SC-4 plus Conduct aerial wildland fire surveillance twice daily using USFS, AFC, or rented OAS approved aircraft and pilot. Bring in outside overhead, crews and equipment and place on standby at staging areas within park if indices are predicted to maintain trigger levels for extended period. Meeting may be held with the Superintendent, Chief of Resource Management, FMO and concerned agency representatives to coordinate resource use and pre-positioning, especially if a wildland fire has been reported on or within 1 mile of the river boundary. Visitor restrictions and/or park closures may be considered. Assign special law enforcement/fire qualified personnel to high wildland fire risk areas. Maintain close communications with local fire agencies to provide mutual assistance as defined in Memoranda of Understanding or Cooperative Agreements. Assign a fulltime dispatcher on any wildland fire for fire time accounting and to maintain an accurate record of fire radio traffic.

APPENDIX I

I. LONG-TERM PRESCRIBED FIRE AND HAZARD REDUCTION PLAN

Buffalo National River (BUFF) Five Year Prescribed Fire/Hazard Fuel Reduction Plan
Note: Unaccomplished projects will be rescheduled based on anticipated workload and other factors. Additional projects may be identified and prioritized as the Wildland Urban Interface develops.

Calendar Year (priority #)	Project Name	Park	Primary Purpose Hazard Fuel Reduction	Resource Management	Acreage	Prior Burn (Y,N,Partial)	Notes
2002	North River Rd	BUFF		X	699	P	Open Fields Program; fuels reduction near boundary
2002	South River Rd	BUFF		X	647	P	Open Fields Program; fuels reduction near boundary
2002	Erbie Campground	BUFF		X	28	N	Open Fields Program
2002	North Erbie	BUFF		X	400	N	Open Fields Program
2002	Gene Rush 4	BUFF		X	900	N	wildlife goals; cooperative burn with AR G&F
2002 (Fall #3)	Love/Hensley	BUFF		X	50	Y	Open Fields Program. Fall 02 project.
2002 (Fall #1)	LBD Cabins	BUFF	X		175	P	Possible WUII Project. Fall 02 project. Moderate to heavy fuels downslope from historic structures. Partially burned in 1996.
2002 (Fall #2)	BP Campground	BUFF	X		71	N	Possible WUII Project. Fall 02 project.
2002	BP Maintenance	BUFF	X		712	P	Possible WUII Project; park structures, moderate to heavy fuels downslope, partial burn in 1997
2002	Toney Bend	BUFF	X		50	N	park houses; moderate fuel loads
2002	Tyler Bend Maintenance	BUFF	X		145	Y	private, park structures; moderate to heavy fuel loads; burned 1n 1996
2003 (Spr#9)	Sod Collier 2	BUFF		X	91	P	Sod Collier prairie and west side of Tyler Bend Road
2003 (Spr #6)	Arnold Bend	BUFF		X	431	Y	Open Fields Program

2003 (Spr#1)	LB Wilderness	BUFF		X	10,887	P	Post Oak/Cedar Glade preservation
2003 (Spr#5)	Gene Rush 1	BUFF		X	1147	N	wildlife goals; cooperative burn with AR G&F
2003 (Spr#3)	Pruitt Complex	BUFF	X		885	P	private, park structures; moderate to heavy fuel loads; partial burn in 1997
2003 (Spr#7)	Hasty	BUFF		X	226	Y	Open Fields Program
2003 (Spr#8)	Ozark House	BUFF	X		164	P	Fuel reduction near park house; cedar glade preservation
2003 (Spr#4)	Pt Peter Mtn	BUFF	X		622	P	reduce d&d fuel accumulations resulting from ice storm, wildfire; private propetry
2003 (Spr#2)	Gilbert East	BUFF	X		150	N	WUII Project. 640 acre project selected from several options after talking with adjoining property owners. Project presents numerous opportunities for the NPS to make good on NFP goals.
2003 (Spr#10	Loafer's Glory	BUFF		X	944	N	Low priority cooperative burn with AR G&F
2003 (Spr#11)	Loafer's Morning	BUFF		X	753	N	Low priority cooperative burn with AR G&F
2003	TB Sprayfield	BUFF	X		3	N	Not in FASTRACS. Dan Jackson's water treatment plant sprayfield
2004	North Tyler Bend Road	BUFF	X		551	N	Hazard fuels reduction near Tyler Bend developed area.
2004	LBD Cabins	BUFF	X		175	P	Possible WUII Project; historic structures, moderate to heavy fuels downslope, partial burn in 1996
2004	BP Campground	BUFF	X		71	N	Possible WUII Project; moderate to heavy fuels
2004	Hasty House	BUFF	X		165	P	park structures; light to heavy fuel loads; partial burn in 2000
2004	Beaver Jim	BUFF	X		6	Y	historic structure; burned in 1997
2004	Gilbert West	BUFF	X			N	WUII Project Rx Burn
2004	TB Sprayfield	BUFF	X		3	Y	Maintenance burn
2004	Pruitt Glade	BUFF		X	252	P	fairly easy access; partial burn in 2000
2004	Cash Bend	BUFF		X	142	Y	Open Fields Program
2004	Stewart/Hickman	BUFF		X	60	Y	Open Fields Program
2004	Woolum House	BUFF	X		11	N	park house; moderate fuel loads' arson area
2004	Gilbert West	BUFF	X		713	N	WUII Project Rx Burn
2004	Maumee	BUFF		X	501	N	Open Fields Program
2004	Gene Rush 5	BUFF		X	1222	Y	wildlife goals; cooperative burn with AR G&F
2004	Rough Edge A	BUFF	X		1069	N	park boundary; private land, structures
2004	Rough Edge B	BUFF	X		146	N	park boundary; private land, structures
2004	Adams	BUFF		X	212	N	Open Fields Program

2005	North River Road	BUFF		X	699	Y	Open Fields Program
2005	South River Road	BUFF		X	653	Y	Open Fields Program
2005	North Erbie Complex	BUFF		X	601	Y	Open Fields Program
2005	Tyler Bend Maintenance	BUFF	X		152	Y	private, park structures; moderate to heavy fuel loads; burned 1n 1996
2005	Toney Bend	BUFF	X		46	Y	park houses; moderate fuel loads
2005	Rush	BUFF	X		21	P	historic structures; light to moderate fuel loads ; partial burn in 1997
2005	TB Sprayfield	BUFF	X		3	Y	Maintenance burn
2005	Gene Rush 2	BUFF		X	2416	Y	wildlife goals; cooperative burn with AR G&F
2005	Riddell	BUFF		X	339	N	Open Fields Program
2006	Sod Collier	BUFF		X	111	P	historic structure; HF reduction
2006	Gene Rush 3	BUFF		X	937	N	Wildlife Goals; cooperative with AR G&F
2006	BP Maintenance	BUFF	X		704	P	Possible WUII Project; park structures, moderate to heavy fuels downslope, partial burn in 1997
2006	TB Sprayfield	BUFF	X		3	Y	
2006	Arnold Bend	BUFF		X	573	Y	Open Fields Program
2006	Love/Hensley	BUFF		X	46	Y	Open Fields Program
2006	Pruitt Complex	BUFF		X	884	P	Open Fields Program, private structures, boundary fuels reduction
2006	Gilbert East	BUFF	X		640	Y	
2007	TB Sprayfield	BUFF	X		3	Y	
2007	Cecil Cove	BUFF	X		995	N	Erbie historic structures protection; also RM goals
2007	Gene Rush 4	BUFF		X	974	Y	wildlife goals; cooperative burn with AR G&F
2007	North Tyler Bend Road	BUFF	X		551	Y	HF Reduction near park developed area
2007	LB Wilderness	BUFF	X		10887	?	Poast oak/Cedar Glade preservation

2007	Gilbert West	BUFF	X			?	WUII Project
2007	Point Peter Mtn	BUFF	X		622	?	hazard fuels reduction; ice storm, wildfire damage; near park boundary

J. FIRE PREVENTION PLAN

FIRE PREVENTION ACTION PLAN

for

Buffalo National River

April, 1992

Submitted by: _____
Fire Management Officer
Buffalo National River

Approved by: _____
Superintendent
Buffalo National River

Date: 4/9/92

APPENDIX J

A. Objectives:

To reduce the threat of human-caused fires through visitor and employee education.

To integrate the prevention message into interpretive programs.

B. General Actions:

Responsible members of park staff will be familiar with the plan and be able to explain it to other interested parties and the general public.

Fire prevention will be discussed at park safety meetings during the fire season.

Interpretive programs will include fire prevention messages to alert visitors during fire season.

Community outreach programs will be developed in cooperation with FIREPRO and interpretive staff.

C. Fire Prevention Plan:

The fire prevention analysis is attached to this plan as an appendix. This appendix contains the detailed prevention actions identified for specific areas or fire problems in the unit. It will be reviewed annually by June 15 of each year and updated if changes occur which alter the identified Risks, Hazards, or Values. An informal review of the plan will also occur after the fall fire season, no later than December 31 of each year.

APPENDIX J

FIRE PREVENTION

A major objective of the park's overall fire management program is to reduce human-caused wildland fires.

An analysis of the park's human-caused wildland fires was undertaken to identify appropriate and achievable action items for reducing these fires.

The analysis was completed using guidelines established in NPS-18, Chapter 11 and the NPS Fire Prevention Handbook. A formal record of the full planning process for the park, including the base maps, overlays and complete Fire Prevention Compartment description are on file in the Fire Management Officer's Office.

The Fire Prevention Action Plan, which will be reviewed formally by June 15 of each year and again informally by December 31 of each year, appears as an appendix of the Fire Management Plan.

APPENDIX J

FIRE PREVENTION ACTION PLAN

GENERAL ACTIONS

The following General Action Items have been identified as elements in the park's overall Fire Prevention Program. They are designed specifically to address the one major cause of human-caused fires at Buffalo National River; arson fires.

Arson Fires
Some certain segments of the local population have historically disagreed with park policies and/or regulations and have used arson fires to reflect their opinions.
Park managers should recognize this and strive to increase interaction with public groups to alleviate public resentment.

1. A human-caused fire prevention message will be developed and included on park bulletin boards.

Responsible person: District Rangers Oct. 15 & Jan. 1
Fire Management Officer.

2. During periods of high fire danger, an increased fire detection program will be implemented.

Responsible person: District Rangers
Fire Management Officer Periods identified by manning classes

3. A fire awareness program will be developed through local groups and schools.

Responsible person: Fire Management Officer January, 1994
Chief of Interpretation

APPENDIX J

SPECIFIC FIRE PREVENTION ZONE RATINGS/ACTION ITEMS

FP ZONE #1 -UPPER END OF PARK TO LEATHERWOOD CREEK

Hazard	High	Upper Wilderness Area, not easily accessible.
Value	High	Boxley Historical District and Upper Wilderness Area.
Risk	Medium	Limited access in Upper wilderness Area, good access in Boxley area. with moderate number of fires

SPECIFIC PREVENTION ACTIONS REOUIRED

Increase patrols during high fire danger, determined by manning class days (as described in fire management plan).

Responsible person(s):

Interpretive staff
Fire Management Officer — On-going, during fire season

FP ZONE #2 -STEEL CREEK RESIDENCE, CAMPGROUND, LAUNCH RAMP

Hazard	Low	Mowed fields, high bluffs some old fields.
Value	High	Ranger residence, research center, outbuildings, and campground.
Risk	High	Campfires, high visitor use, easy access, and moderate number of fires.

SPECIFIC PREVENTION ACTIONS REQUIRED

Post fire danger awareness signs at campground and launch ramp during periods of high fire danger (as described in fire management plan).

Increase patrols during periods of high fire danger determined by manning class days (as described in fire management plan).

Responsible person(s):

Upper District Ranger
Fire Management Officer — on-going during fire season dependent on manning class rating,

APPENDIX J

FP ZONE #3, 6, 9

3 -Ponca Wilderness Area, land area to Erbie
6 -Land area from Mill Creek to Hasty area
9 -Land area downstream from Hasty to Mt. Hersey

Hazard	Medium	Wilderness area, hardwood fuels with steep slopes predominate, limited access.
Value	Low	Primarily woodlands with no developments.
Risk	Low	No incidence of wildland fires, limited access.

SPECIFIC PREVENTION ACTIONS REOUIRED

Increase patrols during high manning class days (as described in fire management plan).

Responsible person(s):

Upper District Ranger
Fire Management Officer — On-going during fire season dependent on manning class rating

FP ZONE #4 -KYLES LANDING AREA

Hazard	Medium	Hardwood fuels.
Value	High	Campground, Camp Orr (Boy Scouts of America), launch ramp.
Risk	Medium	Good access, low incidence of fires.

SPECIFIC PREVENTION ACTIONS REQUIRED

Same as FP Zone #2.

Responsible person (s):

Same as FP Zone #2.

APPENDIX J

FP ZONE #7 -HASTY AREA

Hazard	Low	Fuels are predominately old fields.
Value	High	Ranger residence, launch area, picnic area.
Risk	Medium	Fuel types, easy access, moderate fire occurrence.

SPECIFIC PREVENTION ACTIONS REOUIRED

Same as FP Zone #2.

Responsible person(s):

Same as FP Zone #2.

FP ZONE #8 -CARVER AREA, HWY. 123 CROSSING, DOWNSTREAM TO BIG CREEK

Hazard.	Low	Fuels are predominantly old fields with some hardwood.
Value	Medium	Launch ramp with picnic area.
Risk	Low	Easy access, moderate number of fires

SPECIFIC PREVENTION ACTIONS REQUIRED

Same as FP Zone #2

Responsible person(s):

Same as FP Zone #2.

FP ZONE #10 -MT. HERSEY AREA

Hazard	Medium	Fuels are predominantly hardwood with moderate slopes.
Value	Medium	Launch ramp with picnic area.
Risk	Medium	Easy access, moderate fire occurrence

SPECIFIC PREVENTION ACTIONS REQUIRED

Same as FP Zone #2.

Responsible person(s):

Same as FP Zone #2.

APPENDIX J

FP ZONE #11 -MT. HERSEY. DOWNSTREAM TO THE NARROWS

Hazard	Medium	Fuels predominantly hardwood forest with moderate slopes.
Value	Low	No developments.
Risk	Low	Limited access with low fire occurrence.

SPECIFIC PREVENTION ACTIONS REOUIRED

Increase patrols during high manning class days (as described in fire management plan).

Responsible person(s):

Middle District Ranger Fire Management Officer	On-going during fire season dependent on manning class rating

FP ZONE #12 -NARROWS TO BEAR CREEK

Hazard	Medium	Fuels predominantly hardwood forest with several old fields.
Value	High	Area contains three Ranger residences, two seasonal residences, visitor center, new development with maintenance area and wastewater treatment plant, two campgrounds.
Risk	High	Easy access, highest incidence of fires in park.

SPECIFIC PREVENTION ACTIONS REQUIRED

Post fire danger awareness signs at campground; launch ramps, visitor center.

Make general public aware of high fire danger at visitor center during extended dry periods.

Develop public awareness campaign through local schools

Increased patrols during high manning class days (as described in fire management plan).

Re-station engine during fire season at Tyler Bend.

Responsible person(s):

Middle District Ranger	On-going during fire season dependent on manning class rating
Fire Management Officer	Develop program by 1/94.
Chief of Interpretation	

APPENDIX J

FP ZONE #13 -BEAR CREEK TO MAUMEE AREA

Hazard	Medium	Fuels are predominantly hardwood with some old fields.
Value	Low	No developed areas noted.
Risk	Low	Limited access, low incidence of fires.

SPECIFIC PREVENTION ACTIONS REOUIRED

Same as FP Zone #3.

Responsible person(s):

Middle District Ranger Fire Management Officer	on-going during fire season dependent on manning class rating

FP ZONE #14 -MAUMEE AREA

Hazard	Low	Fuels are predominantly old fields with some hardwoods.
Value	Medium	Launch areas with primitive campground.
Risk	High	Easy access, high incidence of fires.

SPECIFIC PREVENTION ACTIONS REOUIRED

Same as FP Zone #2.

Responsible person(s}:

Middle District Ranger/ Lower District Ranger Fire Management Officer	On-going during fire season dependent on manning class rating

FP ZONE #15 -MAUMEE AREA DOWNSTREAM TO HAT CHUTE

Hazard	Medium	Fuels are predominantly hardwood forests with some old fields.
Value	Low	One primitive campground with mowed field around it.
Risk	Low	Limited access, low incidence of fires

SPECIFIC PREVENTION ACTIONS REOUIRED

Same as FP Zone #3.

Responsible person(s):

Lower District Ranger Fire Management Officer	On-going during fire season dependent on manning class rating

FP ZONE #.16 -HAT CHUTE DOWNSTREAM TO TONEY BEND

Hazard	High	Fuels are predominantly hardwood forests with some old fields.
Value	Medium	Three ranger residences, concession operation, developed campground, historic cabins, maintenance complex, horse barns
Risk	High	Easy access, heavy visitor use, high incidence of fires.

SPECIFIC PREVENTION ACTIONS REQUIRED

Make general public aware of high fire danger through visitor center contacts and interpretive talks.

Responsible person(s):

Lower District Ranger Fire Management Officer	on-going during fire season dependent on manning class rating
Interpretive staff	Develop program by 1/94.

FP ZONE #17 -TONEY BEND TO MOUTH OF RIVER TO INCLUDE LOWER WILDERNESS AREA

Hazard	High	Predominantly hardwood fuels in wilderness area, limited access.
Value	Medium	One launch area with primitive campground, historic buildings at Rush.
Risk	Medium	Limited access except to Rush, moderate incidence of fires.

SPECIFIC PREVENTION ACTIONS REQUIRED

Same as FP Zone #1.

Responsible person(s):

Lower District Ranger Fire Management Officer	On-going during fire season dependent on manning class rating

APPENDIX K

K. RENTAL EQUIPMENT AGREEMENTS

None at this time. (Equipment ordered through normal dispatch channels or through BNR procurement office)

APPENDIX L

L. CONTRACTS FOR SUPPRESSION AND PRESCRIBED FIRE RESOURCES

None at this time. (Resources ordered through normal dispatch channels)